Concept three (3.1)

Hydrosphere and biosphere interactions

Lesson 1

The Earth is a complex system that includes living organisms and nonliving things

▸ *Scientists have divided the Earth into four main systems (or spheres) are: stems*

1• Geosphere 1الغلاف الارضى:

It is the system that includes:

Rocks on the Earth's crust -صخور القشرة الارضية.

- *Molten rocks and heavy metals that lie under the Earth's crust.*

الصخور المنصهرة والمعادن الثقيلة التى تقع اسفل القشرة الارضية

2• Atmosphere الغلاف الجوى:

-It is the system that is composed of a mixture of gases such as nitrogen, oxygen, carbon dioxide, water vapor... etc..

-هو النظام الذي يتكون من خليط من الغازات مثل النيتروجين والأكسجين وثاني أكسيد الكربون وبخار الماء ... إلخ .



3• Biosphere: الغلاف الحيوى

It is the system that includes all living organisms such as microorganisms, plants, animals, humans... etc.

هو النظام الذي يشمل جميع الكائنات الحية مثل الكائنات الحية الدقيقة والنباتات والحيوانات والبشر ... إلخ.

4• Hydrosphere الغلاف المائى:

It is the system that includes all water on the Earth (fresh water and salt water).

How does Earth's biosphere interact with Earth's hydrosphere ?

All living organisms in the biosphere interact with the hydrosphere, where:

- *Humans and animals drink water.*
- *Some animals and plants live in water.*

كيف يتفاعل الغلاف الحيوي للأرض مع الغلاف المائي للأرض؟ تتفاعل جميع الكائنات الحية في المحيط الحيوي مع الغلاف المائي ، حيث - :يشرب الإنسان والحيوان الماء - .تعيش بعض الحيوانات والنباتات في الماء.

**Water is important for all living organisms and also can affect nonliving things*

► How do living organisms use water?

**Living organisms need water to drink, grow and survive.*

►كيف تستخدم الكائنات الحية الماء؟ *تحتاج الكائنات الحية إلى الماء للشرب والنمو والبقاء على قيد الحياة.

► How does water affect nonliving things?

Water can cause weathering of rocks on the Earth's surface and erosion

►كيف يؤثر الماء على الأشياء غير الحية؟ يمكن أن يتسبب الماء في تجوية الصخور على سطح الأرض والتعرية

Weathering التجوية :

It is the breakdown of rocks into smaller particles due to the effect of rain, wind, temperature

هى تفتيت الصخور إلى جزيئاتٍ اصغر بسبب تأثير المطر، ريح، درجة حرارة

After rocks are broken down, erosion process happens

Erosion التعرية

It the transportation of small particles of rocks to another place by water or wind.

هي نقل جزيئات الصخور الصغيرة إلى مكان آخر عن طريق الماء أو الرياح.

The importance of water for life on Earth

Water is found everywhere on Earth, where it is found in rivers, lakes, oceans, seas and underground. About71% (three-quarters)of Earth is covered by water, so our planet looks like a blue marble from space.

يوجد الماء في كل مكان على وجه الأرض ، أينما كان توجد في الأنهار والبحيرات والمحيطات والبحار وتحت الأرض .ما يقرب من ثلاثة أرباع الأرض مغطاة بالمياه ، لذا كوكبنا يشبه الرخام الأزرق من الفضاء .



Solid state (ice) *by freezing in extreme cold weather*	Gas state (water vapor) *by evaporation in hot weather*

• **The total amount of water on Earth does not change**, *even if water changes from one state to another, so we cannot make new water, but we can recycle it.*

Importance of water for life

Water is important for life of living organisms on Earth, where:

Humans and animals drink water to survive.
Plants need water to grow.
Some animals and plants live in water.

Uses of water

Preparing food اعداد الطعام **- bathing** استحمام **- cleaning** التنظيف
-Recreation الإستجمام التسلية **traveling** السفر **- manufacturing** الصناعة

Water bodies on Earth have different forms and locations such as:



Oceans and seas: المحيطات والبحار

- They are very large water bodies. - هي مسطحات مائية كبيرة جداً.
- Oceans and seas always contain salt water.
- تحتوي المحيطات والبحار دائمًا على مياه مالحة.



Lakes: البحيرات

- It is a water body that is surrounded by land.

-- وهي مسطح مائي تحيط به الأرض.

Lakes are often contain fresh water, but sometimes they contain salt water

تحتوي البحيرات غالباً على مياه عذبة، لكنها تحتوي في بعض الأحيان على مياه مالحة



- Rivers الأنهار:

- It is water body that always flows from an area of high altitude (high place) to an area with lower altitude ارتفاع منخفض *(lower place) in a definite channel.*

- عبارة عن مسطح مائي يتدفق دائمًا من منطقة ذات ارتفاع عالٍ (مكان مرتفع) إلى منطقة ذات ارتفاع أقل (مكان منخفض) في قناة محددة.

- Rivers always contain *fresh water*.

- تحتوي الأنهار دائمًا على مياه عذبة.



Estuary المصب:

-It is a water body at which the fresh water of a river meets the salt water of a sea or ocean.

-هو مسطح مائي تلتقي فيه المياه العذبة للنهر بالمياه المالحة للبحر أو المحيط.

- Estuaries always contain mixture of *salt water* and *fresh water.*

تحتوي مصبات الأنهار دائمًا على خليط من المياه المالحة والمياه العذبة.



-**Runoff** جريان سطحى:

It is a water body that is formed of water from rain or melting of snow and moves into rivers or the ground.



: الجريان السطحي

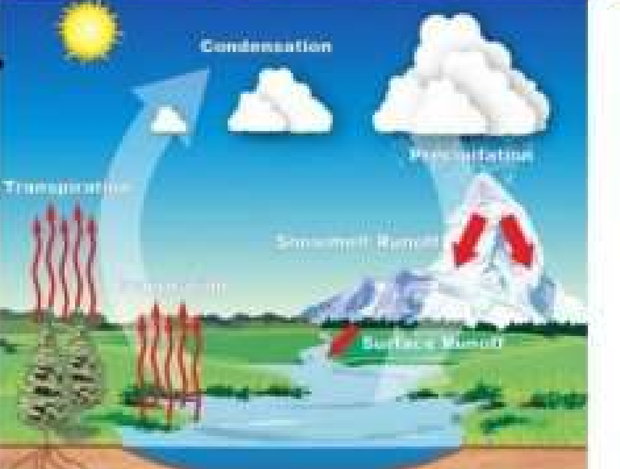
وهو جسم مائي يتكون من الماء من المطر أو ذوبان الثلوج وينتقل إلى الأنهار أو الأرض.

Groundwater المياه الجوفية:

It is the water that lies beneath (under) the Earth's surface.

إنه الماء الذي يقع تحت (تحت) سطح الأرض.

Renewable resource ***means a natural resource can be replaced.***



Is water a renewable resource ?

Water is one of the renewable resources on Earth.

►Because it has "water cycle" in nature.

During the water cycle in nature:

-Water on Earth evaporates and goes into the air forming clouds.

- Water returns back to the Earth's surface during raining.

هل الماء مورد متجدد؟ الماء هو أحد الموارد المتجددة على الأرض .لان لها "دورة مائية" في طبيعتها .أثناء دورة الماء في الطبيعة :
-يتبخر الماء الموجود على الأرض ويذهب إلى الهواء مكونًا السحب - .يعود الماء إلى سطح الأرض أثناء هطول الأمطار .

Are plants considered a renewable resource?

****Plants are one of the components of the biosphere on Earth.***

• Plants can be planted from seeds that grow up forming new plants.

• Plants depend on water to grow, so plants are affected if the amount of water decreases or water get polluted.

Hydrosphere interacts with biosphere, where living Organisms in the biosphere depend on the hydrosphere to survive.

هل تعتبر النباتات موردا متجددا؟ *النباتات هي أحد مكونات المحيط الحيوي على الأرض • .يمكن أن تزرع النباتات من البذور التي تكبر نباتات جديدة • .تعتمد النباتات على الماء في النمو ، وبالتالي تتأثر النباتات إذا انخفضت كمية الماء أو تلوثت المياه .يتفاعل الغلاف المائي مع المحيط الحيوي ، حيث تعيش تعتمد الكائنات الحية في المحيط الحيوي على الغلاف المائي للبقاء على قيد الحياة.

Exercises on Lesson (1)

1 -Choose the correct answer :

1-All the following are components of the atmosphere, except .

a. oxygen gas. b. nitrogen gas. c. molten rocks. d. water vapor

2-Rocks are broken down into smaller particles during……… process

a. photosynthesis b. weathering c. erosion d. respiration

3-Which of the following is a part of the hydrosphere?

a. Water b. Air c. Rocks d. Plants

4-Which of the following is a part of the biosphere

a. Ice b. clouds c. Water d. Animals

5-Water covers nearly …………of the Earth planet

a. $\frac{1}{4}$ b. $\frac{1}{2}$ c. $\frac{1}{5}$ d. $\frac{3}{4}$

6-By heating of water it changes from……… state to ………state

.a. solid-liquid. b. liquid-solid. c. liquid-gas d. gas-liquid

7-Water is used in all the following purposes, except .

a. recreation b. burning c. bathing d. manufacturing

8-At the beginning of water cycle in nature, water …..and goes into …….the air forming

a. freezes - snow b. evaporates - clouds
c. freezes-clouds d. evaporates- snow

2-Choose from column (B) what suits it in column (A)

1-

(A)	(B)
1-Geosphere	a. Contains oxygen and nitrogen gases
2-Atmosphere	b. contains rocks and heavy metals
3-Biosphere	c. contains fresh water and salt water
4-Hydroosphere	d. contain plants and animals
	e. contains clouds and molten rocks

1-………….. 2- ……………. 3- …………. 4- …………

1-

(A)	(B)
1- Oceans	a. contains rocks and heavy metals
2- Lakes	b. contain fresh water only
3- Rivers	c. contains mixture of fresh water and salt water
4- Estuary	d. contain salt water only
5- Groundwater	e. is the water found under the Earth's surface
	f- is the water found in a gas state

1-………….. 2- ……………. 3- …………. 4- …………

3-Put (√) or (X)

1-Water on the Earth is divided into fresh water and salt water. ( )
2. The system that includes rocks and heavy metals is called hydrosphere ( )
3-Rainwater is the only reason for weathering and erosion of rocks on the Earth's surface ( )
4.Water is important for growing of living organisms ( )
5.If there is no hydrosphere, the biosphere will not exist ( )
6.Water can change into water vapour in extreme cold weather .( )
7.The total amount of water on Earth doesn't change . ( )
8.Some animals and plants live in water .( )
9-A river always flows from an area of low place to an area with higher place. ( )
10. When the amount of water decreases or water get polluted, biosphere will be affected ( )

4-Write the scientific term of each of the following:

1. A water body that is surrounded by land (……………..)
2-An area where the fresh water of a river meets the salt water of a sea(………..)
3-A cycle shows the continuous movement of water from the Earth to the atmosphere then to the Earth again (……………..)
4-The process of breaking down of rocks into smaller particles due to the effect of rain, water or temperature, (……………)
5-The process in which the small particles of rocks are transported from a place to another (……………..)

5 -Give reasons for:

\1-Water is important for all plants on Earth

………………………………………………………………………………………

2-Water can affect nonliving things like rocks

………………………………………………………………………………………

3-Our planet looks like a blue marble from the space

………………………………………………………………………………………

4-Water that forms the hydrosphere is one of the renewable resources on Earth

………………………………………………………………………………………

6-What happens to

1.The state of water when it is subjected to extreme cold weather .

………………………………………………………………………………………

2-Fresh water of a river whom it meets the salt water of a sea .

………………………………………………………………………………………

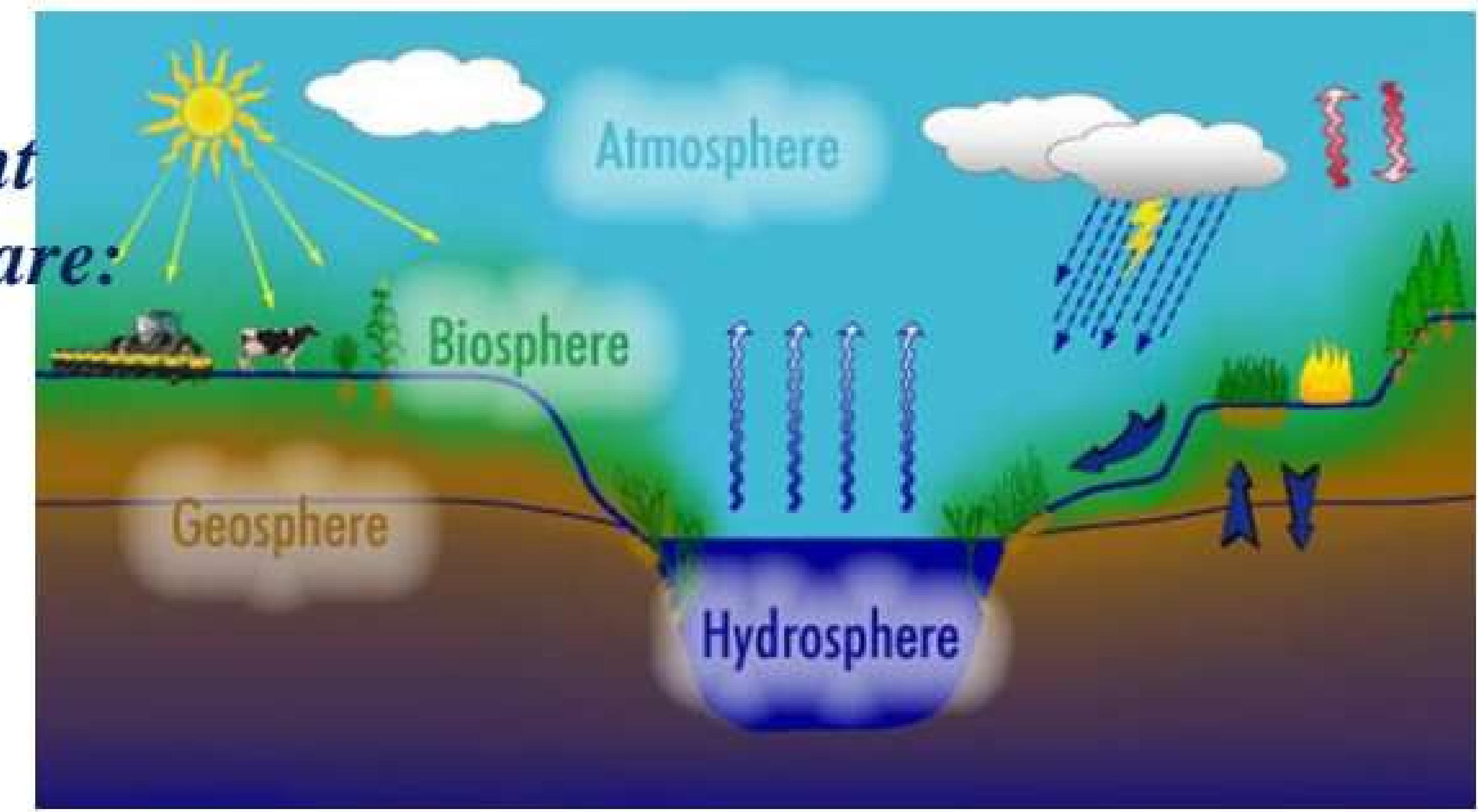
Lesson 2

Activity 5 What is in your Environment? ما هو في بيئتك

In this activity,

some component of an environment classify into the four main groups are:

1- Geosphere (land) غلاف ارضى
2- Hydrosphere (water) غلاف مائي
3- Biosphere (life) غلاف الحيوى
4- Atmosphere (air). غلاف جوى



From this picture

We can classify the living organisms and nonliving things in this picture as shown in the following table

Geosphere (Land)	Hydrosphere (Water)	Biosphere (Life)	Atmosphere (Air)
Soil Rocks	Puddle	Boy Girl Birds Butterflies Tree Grasses Flowers	Wind (that moves the leaves) Breathing of humans and animals

Check your understanding

1-Classify the following water bodies in the following table

(Wind - Mountains - Seas - Deserts - Crocodiles - Insects - Rivers)

Biosphere	Geosphere	Atmosphere	Hydrosphere
....	....	....	....
....	....	....	....

2-(Put (√) or (x):

1- Components of an environment classify them into the two main groups only. ( )
2. Oceans and seas are considered as a part of the atmosphere. ( )
3. Earth's systems don't interact with each other. ( )

Exercises on Lesson (2)

1-Choose the correct answer :

1.Rainwater is a part of a …………

a. Biosphere b. hydrosphere. c. geosphere d. atmosphere

2-Presence of dolphins in oceans represents an interaction between ……. And ……………

a. biosphere-hydrosphere b. biosphere-geosphere
c. hydrosphere - atmosphere. d. hydrosphere-geosphere.

3. Falling of a small tree due to blowing of strong winds is an example of an interaction between ……. And ……………

.a geosphere- atmosphere b. biosphere-hydrosphere
c. hydrosphere - geosphere. d. atmosphere-biosphere

4-Groundwater is present under Earth's surface in rock and soil pores. This is an interaction between ……. And ……………

a. geosphere – atmosphere b. biosphere- atmosphere
c. geosphere-hydrosphere d. hydrosphere-biosphere

5-Acacia tree has very long roots that grow downward through soil rocks to search for groundwater. Which Earth's sphere is not involved in this sentence?

a. Hydrosphere b. Geosphere c. Atmosphere d. Biosphere

2-(Put (√) or (x):

1-Earth's systems don't interact with each other .( )
2-When wind carries seeds of some plants to new places, an interaction between atmosphere and biosphere can be observed ( )
3-Weathering of rocks as a result of the effect of rains is an example of an interaction between hydrosphere and biosphere ( )
4-Water evaporates from the surface of a lake will move from atmosphere to hydrosphere ( )

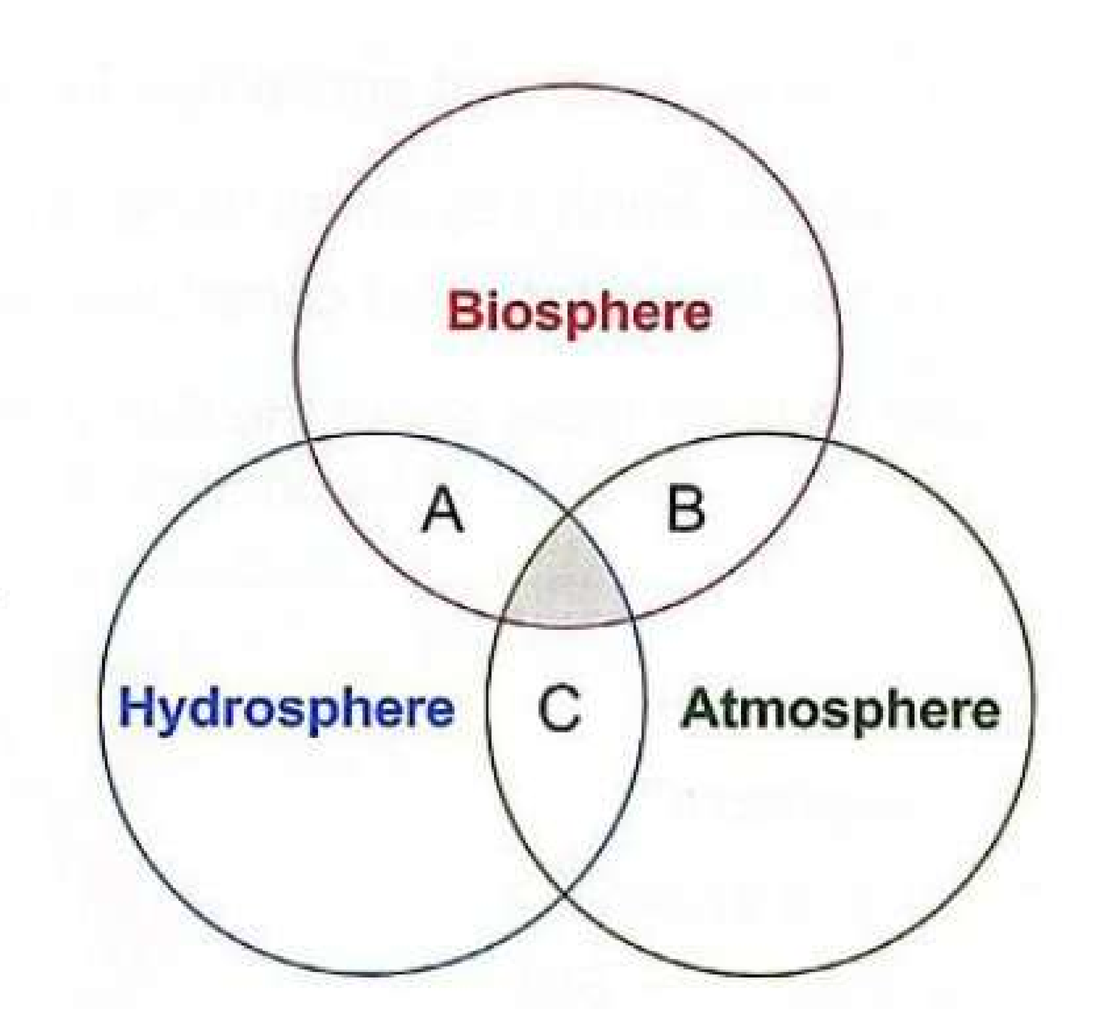
3-Give a reason for the following

Hiding of worms inside the soil is an example of an interaction between two Earth's spheres

………………………………………………………………………………………………………

4-The following model shows a diagram containing three interacted Earth's spheres. Read these sentences, then put (v) or (x):

Area (B) can represent a student respire in .
1.oxygen gas
2-Area (A) can represent small rocks in an ocean.
3. Area (C) can represent evaporation of sea water forming clouds and falling of rains



Mr.-Alifaz .N . Tadrous
01005136959-/-1222978682

Lesson 3

Activity 6 Earth's system

G.R. Scientists named each of the four Earth's systems using the word "sphere"

► *Because the shape of Earth is very close to be a sphere.*

Geosphere الغلاف الارضى

It is the system that includes all the layers of Earth which are the crust, the mantle and inner and outer core.

إنه النظام الذي يشمل جميع طبقات الأرض وهي القشرة والوشاح واللب الداخلي والخارجي.

• The word "Geo" means "Earth".

This system contains:

- Soil. - Minerals. - Rocks. Landforms (such as mountains, valleys... etc.)

- Molten rocks inside Earth.

يحتوي هذا النظام على: - التربة - .المعادن - .الصخور .التضاريس) -كالجبال والوديان ... الخ - (الصخور المنصهرة داخل الأرض .

Hydrosphere: الغلاف المائى

It is the system that includes all of the water on, under and above Earth.

• The word "Hydro" means "water". .

This system contains:

- *Seas* بحار - *Glaciers.* نهر جليدى - *Rivers.* انهار-

- *Oceans* محيطات . - *Groundwater.* مياه جوفية

1-Glacier *is a large sheet of ice or snow that moves slowly over Earth's surface.*

النهر الجليدى هي طبقة كبيرة من الجليد أو الثلج تتحرك ببطء فوق سطح الأرض

2. Hydrosphere *includes another system known as "cryosphere which means the frozen water on Earth*

2. -.1يشمل الغلاف المائي نظامًا آخر يعرف باسم "الغلاف الجليدي" والذي يعني المياه المتجمدة على الأرض

Atmosphere: الغلاف الجوى



the system that includes all the gases that surround Earth.

إنه النظام الذي يشمل جميع الغازات التي تحيط بالأرض.

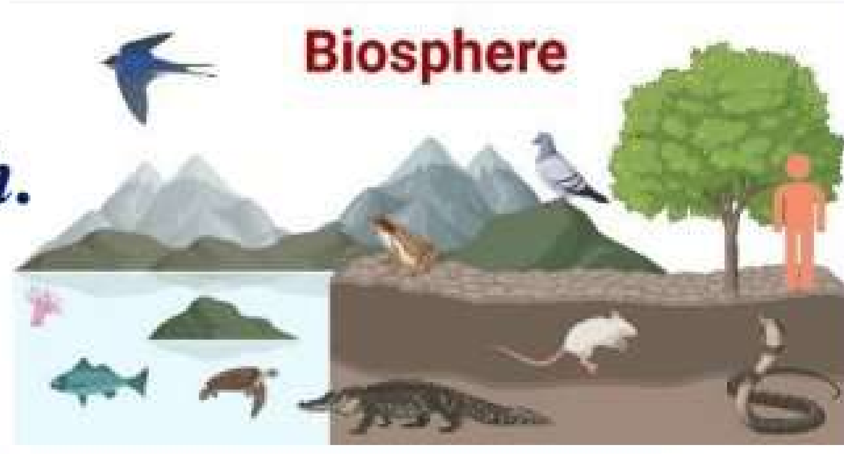
The word "Atmos" means "vapor"

The atmosphere is usually called "air".

• *Air (atmosphere) is a mixture of many gases such as:*

- Oxygen gas. -Nitrogen gas. - Carbon dioxide gas.

Biosphere الغلاف الحيوى



It is the system that includes all living organisms on Earth.

The word "Bio" means "life"

Biosphere contains: - Humans. - Plants. - Animals.

Earth's systems interact تداخل الانظمة الارضية:

The following table represents some phenomena that show the interaction between the different four systems of Earth:

التداخل Interactions	الظاهرة Phenomena
1-Hydrosphere interacts with geosphere	**1-Erosion of rocks by water.** تاكل الصخور بالماء **2-*Formation* of lakes** تكوين بحيرات
2-Atmosphere interacts with biosphere	*During photosynthesis process, plants take in carbon dioxide gas from air and give out oxygen gas to air* أثناء عملية التمثيل الضوئي ، تأخذ النباتات في غاز ثاني أكسيد الكربون من الهواء واتركه غاز الأكسجين للهواء
3- geosphere interacts with biosphere	*During photosynthesis process, plants roots absorb nutrients from the soil to make their own food* أثناء عملية التمثيل الضوئي، تمتص جذور النباتات العناصر الغذائية من التربة لتصنع غذائها

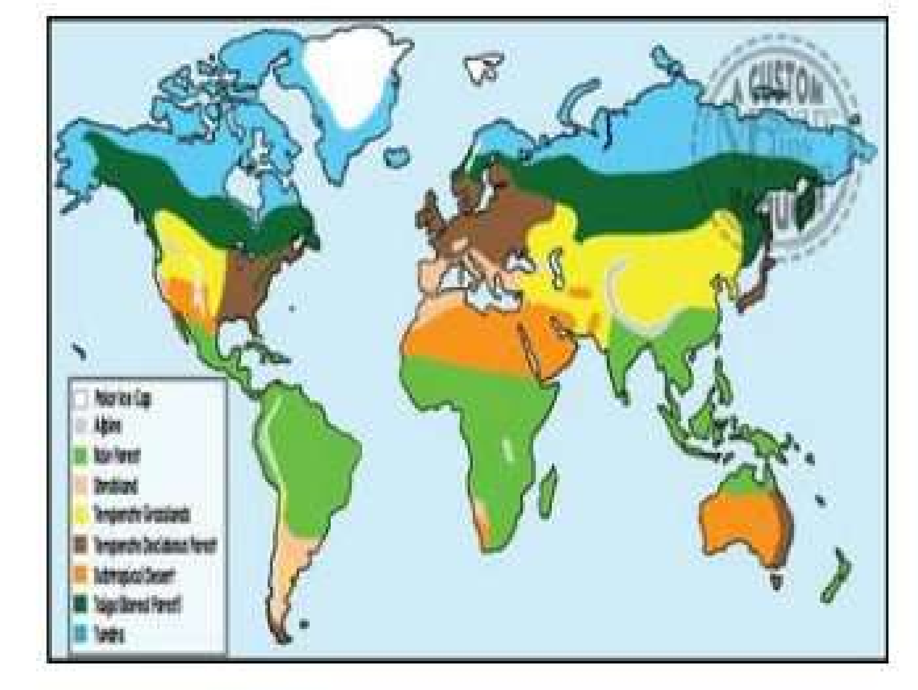
Note *In the previous table, there is an exchange of energy and matter in each phenomena*
في الجدول السابق، هناك تبادل للطاقةِ والمادة في كُلّ الظواهر

Activity 7 Characteristics of the Hydrosphere and Biosphere

خصائص الغلاف المائى والغلاف الحيوى

Hydrosphere and Biosphere and hydrosphere, and some examples that show their interactions.

Some characteristics of biosphere بعض خصائص الغلاف الحيوى



Biosphere *is any part of Earth in which life can exist where it includes humans, animals and plants.*

Biome: منطقة حيوية

It is a large region of the world that has similar soil, climate plants and animals (wildlife).
هو منطقة كبيرة مِنْ العالمِ التي لَها تربةُ ومناخُ ونباتاتُ وحيواناتُ



Examples of biomes:

أرض عشبية - *Grassland.* صحاري - *Deserts.* الغابات- *Forests.*
ارض رطبة - *Wetland.* غابات الأمطار-*Rainforests.*

Some characteristics of hydrosphere بعض خصائص الغلاف المائى

- *Hydrosphere contains all the liquid, solid and gaseous water on Earth.*
- *Nearly 71 percent (71 %) of Earth is covered by water.*

Salt water 96.5%

Fresh water 3.5%

Water that covers Earth may be :

▸ **Salt water** ماء مالح:

-It forms about (96.5 %) of water on Earth.

-It is found in oceans, seas, gulfs and some lakes.

ماء عذب -تشكل حوالي (96.5٪) من المياه على الأرض - .توجد في المحيطات والبحار والخلجان وبعض البحيرات.

▸ **Fresh water**-*It forms about (3.5 %) of water on Earth.*

-It is found in rivers, rainwater, groundwater and most of lakes.

▸ المياه العذبة - تشكل حوالي (3.5٪) من الماء على الأرض - .يوجد في الأنهار ومياه الأمطار والمياه الجوفية ومعظم البحيرات.

-Most of the fresh water on Earth is not found in liquid or running water, but it is found in the form of frozen water as large pieces of ice known as glaciers

أغلب الماء العذبِ على الأرضِ لَمْ تُوْجَدْ في سائلِ أو ماء جاري، لَكنَّه يُوْجَدُ على شكل ماءِ مجمّدِ كقِطَع كبيرة مِنْ الثلجِ المعروفة بالجليدِ

Notes

1. Groundwater *is water that lies beneath (under) Earth's surface and has been leaked into Earth through a layer of porous rocks forming what is known as aquifer.*

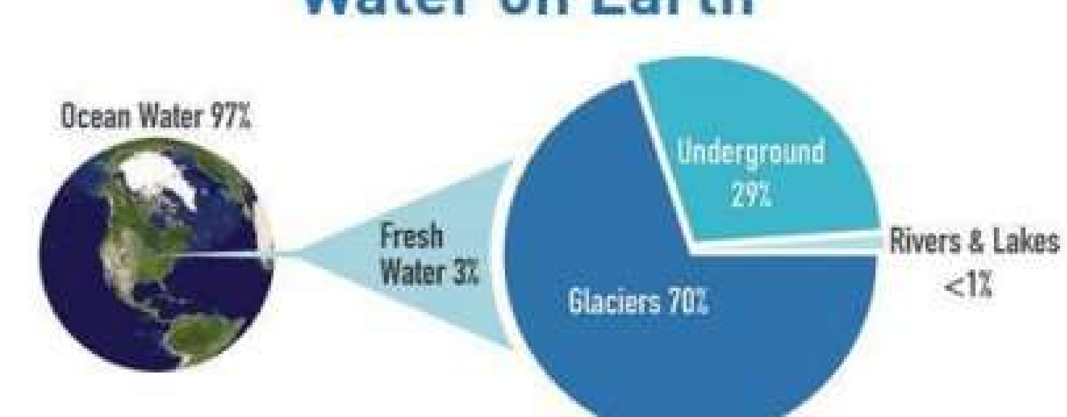
.المياه الجوفيّة ماءُ الذي يوجد تحت سطح الأرضِ وتسرّبَ إلى الأرضِ خلال طبقة الصخورِ المثقّبةِ يُشكّلُ ما يُعرف بالطبقة الجوفيةِ

2. Groundwater supplies wells and springs with water. تُمدُ المياه الجوفيّةُ الآبارَ والعيونُ بالماءِ

Examples of hydrosphere and biosphere interactions:

Humans drink water to survive

البشر يشربون الماء من أجل البقاء



Animals drink water to survive

الحيوانات تشرب الماء من أجل البقاء

Plants need water to survive

النباتات تحتاج إلى الماء من أجل البقاء

Water is the habitat of fish

الماء هو موطن الأسماك

Check your understanding

1-Put (√) or (x):

1. Most of water surfaces on Earth contain salt water. ( )

2. Most of lakes have fresh water, while some other lakes have salt water. ( )

2-Choose the correct answer:

1. Hydrosphere includes all the following items, except……………

a. groundwater. c. molten rocks. b. rivers. d. oceans.

2. The large sheets of ice or snow that moves slowly over Earth's surface are called……

a. biosphere. b. glaciers. c. rocks. d. minerals.

Exercises on Lesson (3)

1-Choose the correct answer :

1. The number of Earth's layers that form geosphere is……
   a. Two b. four c. six d. eight
2. Mountains and valleys are parts of…….
   a. geosphere b. atmosphere c. biosphere d. hydrosphere
3. Nitrogen and oxygen are gases that make most of the……..
   a. biosphere b. geosphere c. hydrosphere d. atmosphere
4.97% of Earth's water is…………..
   a salt water. b. sugar water c. fresh water d. frozen water
5. Formation of lakes is an example of an interaction between ……..and……
   a biosphere-hydrosphere b. atmosphere -biosphere
   c hydrosphere-geosphere d. geosphere- atmosphere
6. Roots fix plants in the soil, this is an interaction between ……..and……
   a biosphere-atmosphere. b. biosphere-geosphere.
   c. hydrosphere-geosphere d. hydrosphere - atmosphere
7. All the following water bodies contain salt water, except………
   a gulfs. b. seas c. oceans d. rivers
8. Which of the following is found between pores of rocks below Earth's surface?
   a. Ice. b. Groundwater c. Oceans d. Water vapor
9. Polar bears live on ice, this is an example of an interaction between …….. and……
   a. atmosphere-hydrosphere. b. geosphere- hydrosphere
   c. biosphere- geosphere. d. biosphere-cryosphere

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1. The word "Geo" refers to	a. water
2. The word "Hydro" refers to	b. Earth
3. The word "Atmos" refers to	c. life
4. The word "bio" refers to	d. vapor
	e. Sun

1-………….. 2- ……………. 3- …………. 4- ………..

3-Put (√) or (x):

1. Al living organisms are parts of the atmosphere ( )
2. Oceans, lakes and rivers are included in the hydrosphere. ( )
3. Deserts and forests are examples of biomes ( )
4. Less than 50% of Earth's surface is covered with water ( )
5. Most of the salt water on Earth is found in the form of frozen water. ( )
6. Fresh water forms about 3% of water on Earth ( )
7. Without water all forms of life will disappear ( )
8. Wells and springs obtain their water from aquifers. ( )
9. All animals and plants can live in aquatic habitats. ( )

4-Write the scientific term of each of the following:

1. The system of Earth which contains all different landforms (…………….)
2. The Earth's system which is made up of water. (…………….)
3. The frozen water part of the hydrosphere. (…………….)
4. The Earth's system which consists of a mixture of gases surrounding Earth (…………….)
5. The system that includes humans, animals and plants on Earth. (…………….)
6. A large area of the world that has similar soil, climate, plants and animals (…………….)

5-Give reasons for:

1. Importance of atmosphere for plants in making their food.

……………………………………………………………………………..

2-More than 50% of known living organisms live in the aquatic environments

……………………………………………………………………………..

3-Most of the fresh water on Earth can't be used for drinking

……………………………………………………………………………..

6-What happens if...?

1. Plants can't get carbon dioxide gas from air.

……………………………………………………………………………..

2. We compare the rainforest biome with the desert biome.

……………………………………………………………………………..

7-Look at this graph that shows the percentage of both salt water and fresh water in Earth's hydrosphere, then Put (√) or (x) in front of the following sentences:

A
B
OCEANS

1. Area (A) represents salt water. ( )
2. Seas and oceans are examples of water bodies that belong to area (B) . ( ).
3. During water cycle, water evaporates from both areas A and B). . ( )
4. The type of water in rivers belongs to area (A). ( )

8- Read the following paragraph, then complete the sentences:

Frogs are amphibians, so they can live on land and in water, frogs inhale oxygen gas and exhale carbon dioxide gas. They feed on insects and use the water to hide from their predators.

1. Frogs can live on land, this is an interaction between biosphere and…….
2. Hiding of frogs in water is an interaction between biosphere and ……….
3. Respiration of frog is an example of an interaction between biosphere and ……………………..

Lesson 4

Activity 9 Hydrosphere or Biosphere

Read the following observations and try to classify them in the table below into hydrosphere or biosphere as the example given:

- *A bird makes a home in a tree.*
- *Water evaporates from a pond.*
- *Saltwater waves crash in the ocean.*
- *Ants eat a piece of bread.*
- *Running water in a river.*
- *A snake eats a rat.*

طائر يصنع منزلًا في :اقرأ الملاحظات التالية وحاول تصنيفها في الجدول أدناه إلى الغلاف المائي أو الغلاف الحيوي كما هو موضح في المثال
ثعبان يأكل فأرا .المياه الجارية في النهر .النمل يأكل قطعة خبز .تحطم موجات المياه المالحة في المحيط .يتبخر الماء من البركة • .شجرة

Hydrosphere	*Biosphere*
Rainwater falls on a river.	*A hawk spots its prey.*
An iceberg breaks off from its glacier	*Bees pollinate a flower*
....	....
....	....
....	....
....	....

Activity 10 Types of Aquatic Ecosystems

Water ecosystems are also called aquatic ecosystems.
Aquatic ecosystems on Earth can be classified in different ways such as they ran be classified into
- Saltwater ecosystems. -Freshwater ecosystems

- .تسمى النظم الإيكولوجية المائية أيضًا بالنظم الإيكولوجية المائية -يمكن تصنيف النظم البيئية المائية على الأرض بطرق مختلفة مثل
- .النظم البيئية للمياه المالحة - النظم البيئية للمياه العذبة

Saltwater ecosystems البيئية للمياه المالحة

Oceans are the largest saltwater ecosystems that cover large parts of Earth's surface.

النظم المحيطات هي أكبر النظم الإيكولوجية للمياه المالحة التي تغطي أجزاء كبيرة من سطح الأرض

.Saltwater ecosystems of oceans and seas include: Shallow areas Deep areas

تشمل النظم الإيكولوجية للمياه المالحة للمحيطات والبحار: المناطق الضحلة المناطق العميقة .

▸ **Shallow areas:** *These areas contain coral reefs and inter-tidal zones.*



المناطق الضحلة: تحتوي هذه المناطق على شعاب مرجانية ومناطق مد

Note :- Intertidal zone *is the area along the coast that disappears underwater at the high tide and appears at the low tide.*

ملاحظة: - منطقة المد هي المنطقة الواقعة على طول الساحل والتي تختفي تحت الماء عند ارتفاع المد وتظهر عند انخفاض المد



▸ **Deep areas:** *These areas are called abyssal zones which are very deep areas in oceans, so that sunlight cannot reach them.*
المناطق العميقة تسمى هذه المناطق بالمناطق السحيقة وهي مناطق عميقة جدًا في المحيطات ، بحيث لا يمكن لأشعة الشمس الوصول إليها

Saltwater lakes بحيرات المياه المالحة *Some lakes have salt water.* تحتوي بعض البحيرات على مياه مالحة

Examples of saltwater lakes:

• Lake Bardawil in Egypt. • Lake Assal in Djibouti.
أمثلة على بحيرات المياه المالحة.بحيرة باروبل في مصر • بحيرة عسل في جيبوتي

*- **Lake Assal** has a high concentration of natural salts, so it is too salty for fish and most aquatic animals to live in also, there are few plants that can grow in this area.*
تحتوي بحيرة عسل على نسبة عالية من الأملاح الطبيعية ، لذا فهي مالحة جدًا للأسماك ومعظم الحيوانات المائية للعيش فيها أيضًا ، وهناك القليل من النباتات التي يمكن أن تنمو في هذه المنطقة.

- There are many different types of bacteria live in Lake Assal. - Lake Manzala, Lake Mariout, Lake Bardawil and Lake Idku are saltwater lakes found in Egypt.
.توجد أنواع مختلفة من البكتيريا تعيش في بحيرة عسل بحيرة المنزلة وبحيرة مريوط وبحيرة البردويل وبحيرة إدكو هي - بحيرات المياه المالحة الموجودة في مصر.

Freshwater ecosystems *include*

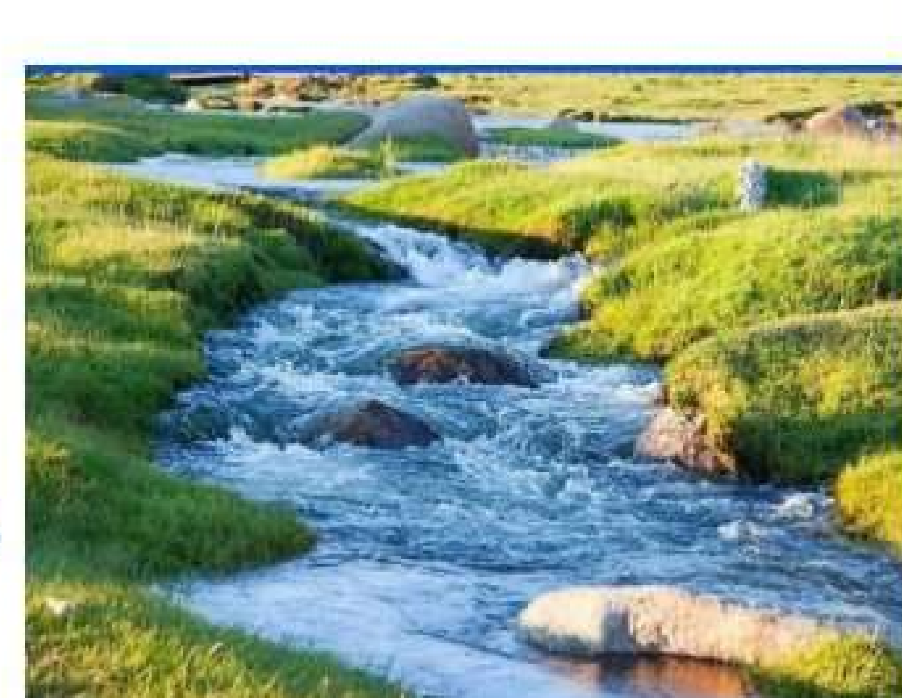
1-Ponds and lakes

In many ponds and lakes, the water is Some other ponds and lakes dry up in the hot summer months, so animals and plants that live there must adapt to the changes that happen in these ponds and lakes

-Lake Nasser, Lake Qaroun and Lake of Wadi Al-Rayan are freshwater lakes in Egypt.

1- البرك والبحيرات المياه في كثير من البرك والبحيرات تجف بعض البرك والبحيرات الأخرى في أشهر الصيف الحارة ، لذلك يجب أن تتكيف الحيوانات والنباتات التي تعيش هناك مع التغيرات التي تحدث في هذه البرك والبحيرات
-. بحيرة ناصر وبحيرة قارون وبحيرة وادي الريان هي بحيرات المياه العذبة في مصر

2-Flowing water bodies: المسطحات المائية المتدفقة



They include rivers and streams (streams are small bodies of flowing water).
وهي تشمل الأنهار والجداول (الجداول عبارة عن مسطحات صغيرة من المياه المتدفقة)

Water is always moving in the flowing water bodies.
يتحرك الماء دائمًا في المسطحات المائية المتدفقة

Streams and rivers connect other bodies of Water such as lakes, oceans and seas
تربط الجداول والأنهار المسطحات المائية الأخرى مثل البحيرات والمحيطات والبحار

Many different plants and animals live in flowing water bodies
تعيش العديد من النباتات والحيوانات المختلفة في المسطحات المائية المتدفقة .

Notes:-1. An estuary *is a special type of aquatic ecosystems. that is formed along the edges of seas or oceans, where a river or stream ends, so an estuary is formed where a river meets a sea or an ocean*

1.المصب هو نوع خاص من النظم الإيكولوجية المائية .التي تتشكل على طول حواف البحار أو المحيطات ، حيث ينتهي نهر أو مجرى مائي ، لذلك يتشكل مصب النهر حيث يلتقي النهر بالبحر أو المحيط



2. Estuaries *have a mixture of salt water from the sea or ocean and fresh water from a river or stream.*

2. مصبات الأنهار بها خليط من المياه المالحة من البحر أو المحيط والمياه العذبة من نهر أو مجرى.

Check your understanding Write the scientific term:

1. The area along the coast between the high tide and the low tide.(...........)

2. The water body where a river meets a sea or an ocean .(……..........)

Activity 11 Aquatic Ecosystems

Compare between some characteristics and species (living organisms) that live in three different aquatic systems which are ponds streams and oceans

1-Ponds

Type of water: *They have fresh water.* نوع الماء: ماء عذب.

Water movement: *They have still water.* حركة الماء: ماء ساكن

Species live in ponds:

There are different living organisms that live in ponds such as:

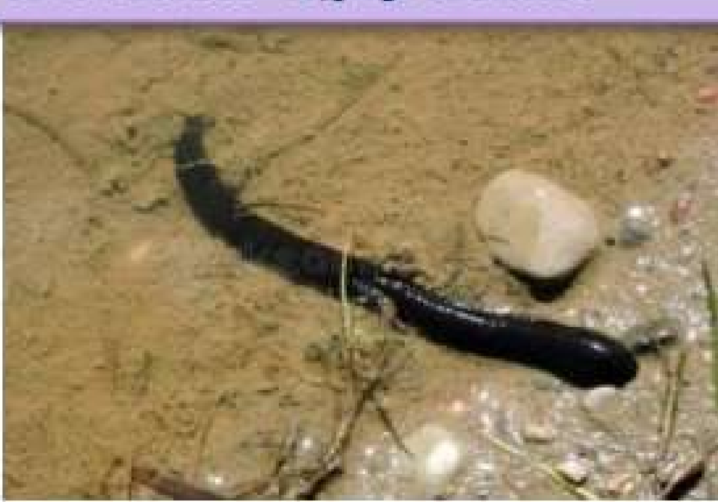
Some plants like water lilies



Some insects live and lay their eggs in ponds



Some types of worms such as leeches live at the bottom of ponds



Salamanders and frogs live in ponds and eat insects found there.



Give a reason for أعط سببا ل

Some insects lay their eggs in ponds تضع بعض الحشرات بيضها في البرك.

Because ponds have still water, so the eggs will not move away.

لأن البرك لا تزال تحتوي على مياه ، لذلك لن يتحرك البيض بعيدًا .

2-Streams تيارات

Type of water: *They have fresh water.* مياه عذبة

Water movement: *They have running water where water in streams are cool and flows fast.*

• حركة المياه: تحتوي على مياه جارية حيث تكون المياه في الجداول باردة وتتدفق بسرعة.

•**Species live in streams**:الأنواع تعيش في الجداول

-Some mosses attach themselves to the rocks of streams (like algae).

- .تلتصق بعض الطحالب بصخور الجداول (مثل الطحالب)

Some animals live in streams such as -catfish – salmon(trout)





تعيش بعض الحيوانات في مجاري مائية مثل سمك السلور – السلمون

3-Oceans and seas

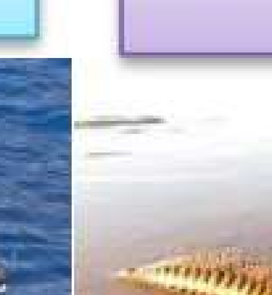
Type of water: *They have salt water*

Water movement: *Water of oceans and seas is constantly moving in the form of waves that crash onto the shore.*

Species live in oceans!

There are many living organisms that live in oceans and seas such as

Kelp عشب البحر	Dolphin	Starfish	Moses fish (Flounder fish)







Notes:-ملاحظات

1. *Oceans and seas environments include many smaller ecosystems.*
2. *Wind also moves the water of oceans and seas forming waves.*
3. *Ocean water circulates around the world in patterns called ocean currents*
4. *The directions of ocean currents around the world can be predicted*

1. .تشمل بيئات المحيطات والبحار العديد من النظم الإيكولوجية الأصغر
2. .تحرك الرياح أيضًا مياه المحيطات والبحار مكونة الأمواج
3. تدور مياه المحيطات حول العالم في أنماط تسمى التيارات المحيطية
4. يمكن التنبؤ باتجاهات التيارات المحيطية حول العالم

Check your understanding -Put (√) or (x):

1. *Dolphins live in ponds and streams.*
2. *Ponds and streams contain fresh water*
3. *Water of oceans is constantly moving in the form of waves*

Exercises on Lesson (4)

1-Choose the correct answer :

1. Cats and grass are parts of the
 a. atmosphere. b. hydrosphere. c. biosphere. d. geosphere.
2. Which of the following is not a component of the hydrosphere ?
 a. Oceans. b. Rivers. c. Lakes. d. Rocks.
3. A spring flows out from a rock is an example of an interaction between…………….. and……………
 a. hydrosphere- geosphere b. hydrosphere- biosphere.
 c. biosphere-geosphere. d. biosphere- atmosphere.
4. Aquatic ecosystems can be classified into ……………ecosystem and …………………. ecosystem
 a forest-desert. b. savannah- tundra
 c. grassland - rainforest. d, freshwater-saltwater.
5. All the following are characteristics of abyssal zone, except ……….
 a. they are very deep areas. b. sunlight cannot reach it.
 c. they are dark areas. d. they are shallow areas.
6. Rivers and streams contain……., while ponds contain ……………water
 a. salt-fresh b. fresh-salt water c. running-still d. still-running
7. Estuaries have a mixture of ……………..and……………
 a. groundwater - rainwater. b. fresh water-salt water.
 c. groundwater-fresh water. d. rainwater-salt water.
8. Water lilies can live in……………
 a. ponds. b. seas. c. oceans. d. deserts.
9. Among animals that can be found in ponds are……………..and……………
 a. lions-salamanders. b. dogs – frogs c. frogs-salamanders d. foxes-bears.
10.………. is a saltwater lake in Egypt.
 a. Lake Nasser b. Lake Qaroun
 c. Lake Manzala d. Lake of Wadi Al-Rayan
11. All the following are saltwater lakes, except
 a. Lake Assal. b. Lake Nasser. c. Lake Idku. d. Lake Bardawil

2-Choose from column (B) what suits it in column (A)

(A)	(B)
1 Shallow areas of oceans	a. don't receive sun light
2. Abyssal areas of oceans	b. contain coral reefs
3. Frogs	c. live in salt water
4. Dolphins	d. live in fresh water
	e. live in desert

1-………….. 2- ……………. 3- ………….. 4- …………

3-Put (√) or (x):

1. Living organisms are parts of geosphere ( )
2 All of the water on Earth represents the hydrosphere ( )
3. There are no living organisms live in the hydrosphere ( )
4. Gases which surround the Earth represents the atmosphere( )
5. There is only one type of aquatic ecosystems known as saltwater ecosystems( )
6. The deep areas of the ocean that sunlight cannot reach it, are called abyssal zones ( )
7. Some ponds and lakes may dry up in winter months ( )
8. The place where two oceans meet is called an estuary ( )
9. Some types of worms such as leeches live at the bottom of ponds ( )
10. Rivers and streams are freshwater moving bodies. ( )
11. Some animals live in streams such as catfish, crayfish and trout ( )

3-Write the scientific term of each of the following:

1. The largest saltwater ecosystems that cover large parts of Earth's surface (……………………..)
2. Areas of the ocean which contain coral reels and intertidal zones(…………….)
3. The area along the coast that disappears at the high tide and appears at the low tide. (……………………..)
4. An area where a river or a stream meets an ocean. (……………………..)

5- Give reasons for:

1. Some ponds and lakes may dry up during some months.

……………………………………………………………………………..

2. No green plants can survive in the abyssal zones of oceans.

……………………………………………………………………………..

3. Mosquitoes lay their eggs in ponds.

……………………………………………………………………………..

6- What happens to…?

1. Animals that live in lakes if they dry up.

……………………………………………………………………………..

2. The eggs of a frog if it lays its eggs in a river instead of a pond.

……………………………………………………………………………..

Lesson 5

Activity 12 Record Evidence Like a Scientist

answer a question about one of the main ports of this concept through four main steps

-Step 1: The Question *-Step 2 My Claim*

Step 3: My Evidence- *-Step 4: My Scientific Explanation*

Step 1: The Question الخطوة 1: السؤال

How does Earth's biosphere interact with Earth's hydrosphere?

كيف يتفاعل الغلاف الحيوي للأرض مع الغلاف المائي للأرض؟

Step 2 My Claim الخطوة 2 مطالبتي

Living organisms in the Earth's biosphere depend on the interactions with the Earth's hydrosphere for survival

تعتمد الكائنات الحية في المحيط الحيوي للأرض على التفاعلات مع الغلاف المائي للأرض من أجل البقاء

Note *Your claim should be formed of a sentence that gives an answer for the previous question in step*

ملاحظة يجب أن يتكون مطالبتك من جملة تعطي إجابة عن السؤال السابق في الخطوة

Step 3: My Evidence الخطوة 3: دليلي

-Water from rain gives plants the water they need to survive.

مياه الأمطار تمنح النباتات المياه التي تحتاجها للبقاء على قيد الحياة

Humans and animals need to drink water to survive.

يحتاج البشر والحيوانات إلى شرب الماء للبقاء على قيد الحياة

- Many animals live in water habitats. تعيش العديد من الحيوانات في عوائل مائية

Note *You should mention enough and suitable evidence that support your claim.* ملاحظة يجب أن تذكر أدلة كافية ومناسبة تدعم مطالبتك

Step 4 My Scientific Explanation الخطوة 4 الشرح العلمي

-Earth's hydrosphere interact with Earth's biosphere when animals and plants live in it or use it for their basic needs.

.يتفاعل الغلاف المائي للأرض مع المحيط الحيوي للأرض عندما تعيش فيه الحيوانات والنباتات أو تستخدمه لتلبية احتياجاتها الأساسية

-Plants depend on water to grow. تعتمد النباتات على الماء في النمو

-Some animals live in water where they depend on the underwater environment for shelter and to find the food that they eat.

تعيش بعض الحيوانات في الماء حيث تعتمد على البيئة تحت الماء في المأوى والعثور على الطعام الذي تأكله

-Humans and animals need to drink enough water to survive.

يحتاج البشر والحيوانات إلى شرب كمية كافية من الماء للبقاء على قيد الحياة

Note ملحوظة

Your scientific explanation should explain your claim and evidence introducing some supportive examples from what you have learned.

.يجب أن يشرح تفسيرك العلمي ادعائك وأدلتك مع تقديم بعض الأمثلة الداعمة مما تعلمته

Activity 13 STEM in Action



Put (✓) or (x):

1. Plastic waste materials cause water pollution. ( )
2. Throwing plastic waste materials in rivers and seas don't affect the life of aquatic organisms. ( )

▸ To understand water, hydrologists must study how the hydrosphere interacts with the other spheres on Earth such as:

لفهم المياه ، يجب على علماء الهيدرولوجيا دراسة كيفية تفاعل الغلاف المائي مع المجالات الأخرى على الأرض مثل:

-How water runs across the land (geosphere), كيف تجري المياه عبر الأرض (الغلاف الأرضي) ،

- How water affects living organisms (biosphere).

كيف تؤثر المياه على الكائنات الحية (المحيط الحيوي)

Hydrologists are scientists who study water علماء الهيدرولوجيا هم علماء يدرسون المياه

- What happens to water in air (atmosphere).

Microplastics البلاستيك الدقيق

• Microplastics are plastic pieces whose lengths are less than 5 millimeters.

البلاستيك الدقيق عبارة عن قطع بلاستيكية يقل طولها عن 5 ملم

• Microplastics are formed when plastic waste is broken down into small particles by wind, sunlight and wave action at sea.

تتكون البلاستيك الدقيق عندما تتحلل النفايات البلاستيكية إلى جزيئات صغيرة بفعل الرياح وضوء الشمس وحركة الأمواج في البحر.

• **Microplastics** are found everywhere on Earth, from the highest place on land to the deepest part of the ocean.

توجد اللدائن الدقيقة في كل مكان على الأرض ، من أعلى مكان على الأرض إلى أعمق جزء من المحيط.

• Hydrologists are concerned about the amount of plastic pollution found in the hydrosphere يهتم علماء الهيدرولوجيا بكمية التلوث البلاستيكي الموجود في الغلاف المائي

•Microplastics found in aquatic ecosystems are more harmful to aquatic organisms than large plastic waste, where aquatic organisms cannot differentiate between their real food and plastic waste, so they can eat these pieces of plastic and get harmed.

تعد البلاستيك الدقيق الموجودة في النظم البيئية المائية أكثر ضررًا للكائنات المائية من النفايات البلاستيكية الكبيرة ، حيث لا تستطيع الكائنات المائية التفريق بين طعامها الحقيقي وفضلاتها البلاستيكية ، لذلك يمكنها أن تأكل هذه القطع البلاستيكية وتتعرض للأذى.

Analyzing pollution

• A group of scientists in india wanted to learn more about the effects of microplastics on the environment.

These scientists took samples of the water and the soil of a polluted river and they found that microplastics were present in the water and the soil of that river.

After analyzing these samples, scientists found that most of these microplastics were from decayed plastic carry bags, packing materials, and fishing lines.

Exercises on Lesson (5)

1-Choose the correct answer :

1. Hydrologists study the movement of……….. across the earth

a. air b. rocks c. water d. planes

2. All the following are factors affecting the breakdown of plastics into microplastics, except………..

a. sunlight b. moon. c. wind d. sea waves.

3 Water evaporation and its condensing on planet Earth show an interaction between ………….and………….

a. hydrosphere- atmosphere b. hydrosphere-biosphere

c. biosphere-geosphere. d. biosphere- atmosphere

4. All the following organisms can be negatively affected by throwing plastic was in seas, except

a fish. b. shrimps. c. corals. d. foxes

2-Put (✓) or (x):

1. Microplastics are large plastic pieces which can harm oceans and aquatic life. ( )

2. Some aquatic organisms cannot differentiate between their real food and plastic waste ( )

3. Microplastics can be found in water as well as in soil ( ).

4. Throwing plastic waste materials in rivers and seas never affect the life of aquatic organisms. ( ).

5. Some human activities are responsible for water pollution, ( ).

3- Write the scientific term of each of the following:

1. A type of pollution that occurs as a result of throwing waste in rivers and seas. (……………….)

2. The scientist who studies water and its movement around the Earth.(……..)

3. Tiny plastic particles that result from the breakdown of larger plastics(…….)

4- Give reasons for:

Recycling the plastic bottles is more better than throwing them in seas and oceans

…………………………………………………………………...

5-What happens if…?

Aquatic organisms eat pieces of plastic instead their real food

…………………………………………………………………...

Concept three (3.2)

Water as a valuable natural resource

Lesson 1

Activity 1

There are many natural resources on Earth such as water, metals (like gold, silver and aluminum), plants...etc.

..هناك العديد من الموارد الطبيعية على الأرض مثل المياه والمعادن (مثل الذهب والفضة والألمنيوم) والنباتات ... إلخ

Water considered a valuable natural resource on Earth? .

Water is a valuable natural resource that is found in nature and used by living organisms, where:

-All living organisms (humans, animals and plants) need water to survive.

- Water makes up nearly two-thirds (2/3)of the human body.

- Water keeps the body temperature of living organisms moderate.

- :الماء مورد طبيعي ثمين موجود في الطبيعة وتستخدمه الكائنات الحية ، حيث .تعتبر المياه موردا طبيعيا قيما على الأرض؟
يشكل الماء ما يقرب من ثلثي - .تحتاج جميع الكائنات الحية (البشر والحيوانات والنباتات) إلى الماء للبقاء على قيد الحياة
.يحافظ الماء على درجة حرارة الجسم معتدلة للكائنات الحية - .جسم الإنسان

There is a limited amount of water on Earth, where:

-Most of the water is salt water which cannot be processed by most plants and animals.

-So, we must conserve fresh water and prevent it from pollution, where polluted water can harm plants and animals

.توجد كمية محدودة من المياه على الأرض ، حيث معظم المياه عبارة عن مياه مالحة لا يمكن معالجتها بواسطة معظم النباتات والحيوانات
.لذلك يجب الحفاظ على المياه العذبة ومنعها من التلوث حيث يمكن للمياه الملوثة أن تضر بالنباتات والحيوانات

Activity 2 The Importance of Water

put (√) or (x):

1. Water is used in many purposes such as cleaning vegetables and fruits. ( )

2. Water is important to all living organisms to survive. ( )

Uses of water استخدامات الماء

• Humans can use water in many purposes such as: drinking, bathing, cleaning vegetables and fruits, fishing and transportation.

يمكن للبشر استخدام المياه في العديد من الأغراض مثل: الشرب والاستحمام وتنظيف الخضار والفواكه وصيد الأسماك والنقل

Some other uses of water such as: بعض الاستخدامات الأخرى للمياه مثل

Generating electricity توليد الكهرباء



Agriculture الزراعة



Sources of fresh water

- Rivers -Streams -Lakes -
• Glaciers - Groundwater (Aquifers) -Ponds -

مصادر المياه العذبة هناك العديد - البحيرات - - الأمطار
الأنهار - الأنهار الجليدية - المياه الجوفية (الجوفية) - البرك –

Sources of salt water

- Seas -Oceans -

المحيطات البحار

Check your understanding Put (√) or (X)

1. In Egypt, water is used to generate electricity at the Aswan High Dam ( )
2. Water is used for agriculture in Egypt. ( )

Activity 3 Water As a Valuable Natural Resource?

There are two different types of water: -Fresh water - Salt water

هناك نوعان مختلفان من المياه: - مياه عذبة - مياه مالحة

1-Sources of fresh water *-Rivers –Rains- Glaciers - Groundwater (Aquifers) –Ponds- Streams*

- مصادر المياه العذبة - الأنهار - الأمطار - الأنهار الجليدية المياه الجوفية (طبقات المياه الجوفية) - البرك - مجاري المياه

2- Sources of salt water: *- Oceans -Seas*

مصادر المياه المالحة: - المحيطات - البحار -2

Note :- *Most of lakes contain fresh water and some contain salt water.*

ملحوظة: - تحتوي معظم البحيرات على مياه عذبة وبعضها يحتوي على مياه مالحة

Conserving fresh water المحافظة على المياه العذبة

Conserving fresh water means using water in a correct way,

يعني الحفاظ على المياه العذبة استخدام الماء بطريقة صحيحة ،

because *the percentage of fresh water that is suitable for drinking is very small compared to the percentage of water on Earth.*

لأن نسبة المياه العذبة الصالحة للشرب صغيرة جدًا مقارنة بنسبة المياه على الأرض.

conserve the limited amount of fresh water through many ways such as

1-Drinking more juice instead of water,
2-Turning off water tap (faucet) during brushing your teeth.
3-Taking a quick shower.
4-Turning off the water, while washing your hair.

لذلك ، يجب علينا الحفاظ على الكمية المحدودة من المياه العذبة من خلال العديد من الطرق مثل 1-شرب المزيد من العصير بدل الماء.
2-إغلاق صنبور الماء أثناء تنظيف أسنانك بالفرشاة. 3-أخذ حمام سريع. 4-إطفاء الماء أثناء غسل شعرك.

Check your understanding Complete the following statements:

1. There are two types of water which are……. and …….
2. From sources of fresh water are……..,……… and …….
3. From sources of salt water are……. and …….

Concept three (3.2)

Exercises on Lesson (1)

1-Choose the correct answer :

1. The basic liquid matter which is needed by humans, animals and plants to survive is

a. milk. b. water. c. oil d. alcohol.

2. Water can control the ………… of living organisms bodies.

a. length b. height c. temperature d. volume

3. All the following are from sources of water on the Earth, except

a. aquifers. b. ponds. c. glaciers d. molten rocks.

4. Among the ways of conserving fresh water is

a. taking a quick shower. b. keep faucet opening during wash your hair.
c. drinking more water instead of juice. d. taking a long shower.

5. Among the sources of water which human can use for drinking ………

a. Seas b. oceans. c. saltwater lakes. d. rivers.

6. Human can use water in all the following purposes, except…….

a. fishing. b. transportation
c generating electricity. d. weathering of rocks.

7. The amount of salt water on the Earth is……. the amount of fresh water.

a larger than b. smaller than c. equal to d. half

2-Put (√) or (X)

1. Water makes about two-thirds of human body. ( )
2. Among the sources of fresh water are rains. ( )
3. The percentage of fresh water is higher than that of salt water, so we should conserve salt water. ( )
4. Turning off the water tap, while washing your hair is from the ways to conserve water. ( )
5. Oceans are considered as saltwater bodies. ( )
6. We can drink the water of seas. . ( )

3-Write the scientific term of each of the following:

1. It is the liquid that makes up about two-thirds of the human body (…..…….)
2. A type of water which is suitable for drinking. (…..…….)

4- Complete the following sentences

1. High Dam water is used to generate……………….
2 Rivers contain………….. while oceans contain………….. water
3. Glaciers are sources of fresh water which have a……… state of mater
4. We must take a quick shower to conserve………………..

5 -Give reasons for:

1. We must conserve fresh washer?

………………………………….……………..

2. You should turn off water tap during brushing your teeth

………………………………….……………..

6- What happens if...?

People don't conserve fresh water

………………………………….……………..

………………………………….……………..

7-Put (F) in front of the sources of fresh water and (S) in front of the sources of salt water:

1. Nile River. (….…….)
2. Seas (….…….)
3. Water streams. (….…….)
4. Lake Assal (….…….)
5. Aquifers. (….…….)
6. Oceans. (….…….)

8 Look at the opposite graph, then complete the sentences below:

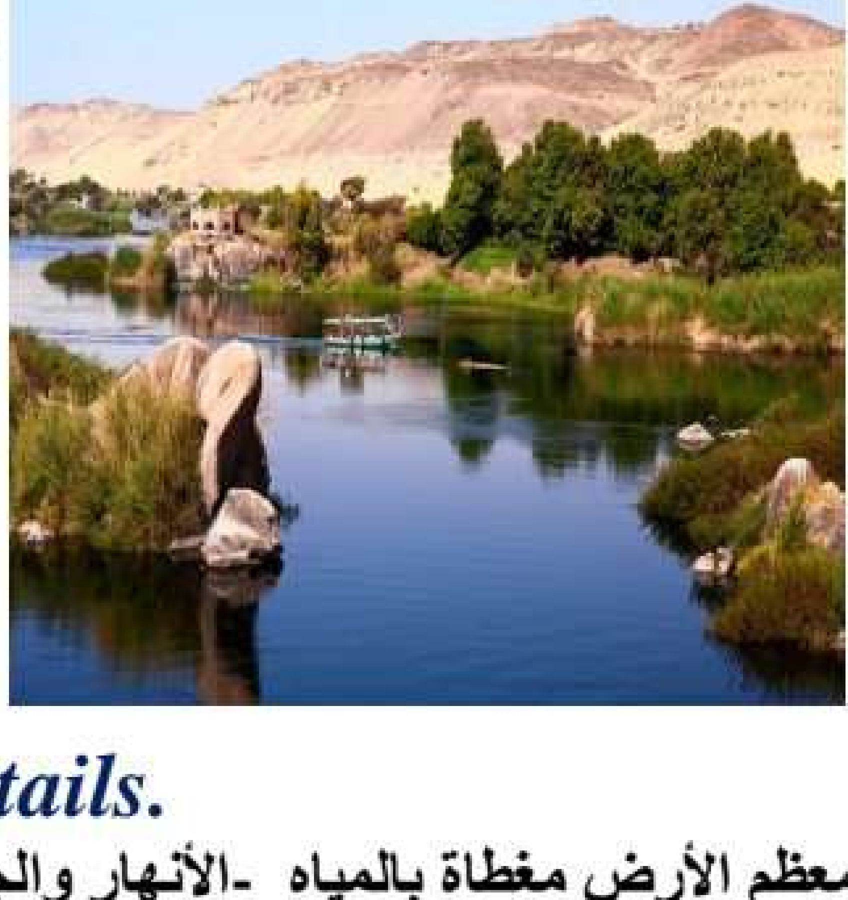


1. Part…….. represents fresh water, while represents salt water.
2. The type of water which human can drink, is …………
3. Ocean is an example of water bodies which is included in part………………
4. We must conserve the type of water that is represented by part………. Because………………..

Lesson 2

Activity 4 Water of Earth

Look at the opposite picture, then 2-Put (√) or (X)



1-River is considered from source of fresh water ( )

2. Fresh water represents 3% of water area on the Earth's surface ( )

Most of Earth is covered with water, where

- Rivers, streams, ponds….. etc. contain fresh water

- Oceans and seas contain salts water

-Also, there in some water underground

-in this activity, *we will study some water bodies in details.*

معظم الأرض مغطاة بالمياه -الأنهار والجداول والبرك... .. الخ تحتوي على مياه عذبة - تحتوي المحيطات والبحار على مياه مالحة أيضا يوجد في بعض المياه الجوفية.في هذا النشاط سوف ندرس بالتفصيل بعض المسطحات المائية - - .،



1-A river



Type of water: *Fresh water* نوع المياه: مياه عذبة

Location: *Mountains* الموقع: الجبال

How is a delta formed?

1-A river often starts- in the mountains as a stream

1-غالبًا ما يبدأ النهر - في الجبال – كجدول

2-Fast moving water in a river can erode deep valleys.

2-المياه سريعة الحركة في النهر يمكن أن تؤدي إلى تآكل الوديان العميقة.

3-As the water moves quickly across the land, it picks up sediments

3-عندما يتحرك الماء بسرعة عبر الأرض ، فإنه يلتقط الرواسب

4-The flow of a river ends when it meets a sea or a larger river

4-ينتهي جريان النهر عندما يلتقي بحرًا أو نهرًا أكبر

5-The water slows down and sediments are deposited at the river's endpoint forming a delta.

5-يتباطأ الماء وتتراكم الرواسب عند نقطة نهاية النهر مكونة دلتا.

Note



Delta *is a triangular shaped area of mud and other sediments that forms when a river meets a sea of a larger river.*

دلتا هي منطقة مثلثة الشكل من الطين والرواسب الأخرى التي تتشكل عندما يلتقي نهر ببحر نهر أكبر.



2 A lake البحيرة

Type of water: *Most of lakes contain fresh water.*
نوع المياه: تحتوي معظم البحيرات على مياه عذبة

Location: *Low-lying areas.* الموقع: المناطق المنخفضة

-A lake is a large body of water surrounded by land.
-A lake forms when water collects in a low-lying area.
.تتشكل بحيرة عندما تتجمع المياه في منطقة منخفضة - .البحيرة عبارة عن مسطح مائي كبير محاط بالأرض - ..



3-A wetland أرض رطبة

Type of water: *Fresh water or salt water.*
نوع المياه: مياه عذبة أو مياه مالحة

- **Location**: *Land partially covered with water. .*
الموقع: الأرض مغطاة جزئيا بالمياه

- **From kinds of wetlands**: *Swamps (marshes) and ponds (bogs).* (المستنقعات) والبرك (المستنقعات) من أنواع الأراضي الرطبة: المستنقعات .



4-An estuary مصب

- **Type of water**: *Salt water mixes with fresh water.*
نوع الماء: يمتزج الماء المالح مع الماء العذب

Location: *Where a river meets a sea or an ocean.*
الموقع: حيث يلتقي النهر ببحر أو محيط

Estuaries are home to thousands of plants and animals. تعد مصبات الأنهار موطنًا لآلاف النباتات والحيوانات



5- Groundwater مياه جوفية

Type of water: *Fresh water.* نوع المياه: مياه عذبة

Location: *In the cracks and spaces of underground rocks* الموقع: في شقوق ومسافات الصخور الجوفية

There is more amount of groundwater on Earth than the water in rivers and lakes.
.كمية المياه الجوفية على الأرض أكثر من كمية المياه في الأنهار والبحيرات

Oceans المحيطات

Type of water : *Salt water.* نوع الماء: ماء مالح

-**Location**: *Oceans surround the continents.*
الموقع: المحيطات تحيط بالقارات

All of the oceans are connected to each other.
The ocean's floor has mountains, plains and plateaus.
يحتوي قاع المحيط على جبال وسهول وهضاب .كل المحيطات متصلة ببعضها البعض ..

Check your understanding

Classify the following water bodies in the following table

(oceans-rains- seas-glaciers-groundwater-rivers)

Salt water	Fresh water
....	....

Activity 4 Earth's Fresh Water

We must protect the freshwater environments on Earth, يجب علينا حماية بيئات المياه العذبة على الأرض

Where fresh water is needed for drinking, irrigation, agriculture, industry, generating electricity, etc. More than 10% of the world's animal species live only in freshwater habitats.

، حيثما تكون هناك حاجة للمياه العذبة للشرب والري والزراعة والصناعة وتوليد الكهرباء وما إلى ذلك. يعيش أكثر من 10٪ من أنواع الحيوانات في العالم فقط في موائل المياه العذبة.

Fresh water scarcity and quality are two main risks that are threatened the world. . تعد ندرة المياه العذبة وجودتها خطرين رئيسيين يهددان العالم

Poor quality of fresh water leads to: تؤدي نوعية المياه العذبة الرديئة إلى

-The death of thousands of living organisms every year. موت آلاف الكائنات الحية كل عام

-The extinction of some species live in fresh water such as some fish and amphibians انقراض بعض الأنواع تعيش في المياه العذبة مثل بعض الأسماك والبرمائيات

Give a reason for: أعط سببًا لـ

Poor quality of fresh water has dangerous effects on living organ?

النوعية الرديئة للمياه العذبة لها آثار خطيرة على الأعضاء الحية؟

Because poor quality of fresh water leads to the death of some living organisms and the extinction of some living organisms live in fresh water.

لأن نوعية المياه العذبة الرديئة تؤدي إلى موت بعض الكائنات الحية وانقراض بعض الكائنات الحية التي تعيش في المياه العذبة :.

Check your understanding Put (√) or (X)

1. *Fresh water scarcity and quality are two main risks that are threatened the world.* ( )
2. *Poor quality of fresh water leads to extinction of some species live in fresh water.* ( )
3. *More than 10% of the world's animal species live only in freshwater habitats.* ( )

Mention four uses of fresh water.

1. ....
2. ....
3. ....
4. ....

Exercises on Lesson (2)

1 -Choose the correct answer :

1.Delta is formed when

a. the speed of water increases *b. the speed of water decreases.*
c. the amount of river's water decreases. *d. the river's water dry up.*

2. At the end of Nile River Delta, there is a/an between Nile River and Mediterranean sea.

a. lake *b. wetland* *c. ocean* *d. estuary*

3-………..are formed when water collects in low-lying areas.

a. Seas *b. Oceans* *c. Lakes* *d. Rivers*

4. Among the kinds of wetlands are………….

a swamps and lakes. *b. marshes and bogs.*
c. ponds and oceans. *d swamps and estuaries.*

5. Estuary is formed when the water of……….. meets the water of…….

a . a river-a sea *b. a river-groundwater.*
c. a sea-an ocean *d. a sea-a wetland.*

6. The floor of ………..may contain mountains and plateaus

a. wetland *b. Oceans* *c. Rivers* *d. lakes*

7. Among the examples of freshwater bodies in which more than 10% of the world's animals species live are

a. rivers and seas *b. streams and seas*
c. oceans and seas *d. rivers and streams.*

8. The type of water that is found in the sea is………….

a. salt water only *b. fresh water only.*
c. salt and fresh water. *d. neither salt nor fresh water.*

9. People obtain their needs of ………that is found in lakes, rivers, streams and groundwater.

a. oxygen gas *b. seaweed* *c. salt water* *d. fresh water*

10. Among the risks that threaten lots of water areas on Earth are

a. conservation and scarcity *b. scarcity and poor quality.*
c. conservation and poor quality. *d. conservation and extinction.*

2- Put (√) or (X)

1. Rivers often start in mountains in the form of estuaries ( )
2. Valleys can be formed by rivers due to fast movement of river's water ( )
3. Assal lake is surrounded by land and it is a low-lying area ( )
4. The type of water in wetlands is salt water only ( )
5. There is an estuary between Nile River and Mediterranean Sea ( )
6. Groundwater is formed in the cracks and spaces between underground rocks ( )
7. Ocean's floor may have mountains, plains and plateaus ( )
8- High quality of fresh water leads to the death of marine organisms live in it
9. Scarcity and conservation of fresh water are two main risks that threaten fresh water on Earth ( )

3-Write the scientific term of each of the following:

1. A water body that often starts in the mountain as a stream. (……………)
2. A triangular-shaped area of mud and other sediments that forms when a river meets a sea. (………………..)
3. The large water body that is surrounded by land. (………….…….)
4. The water bodies that surround the continents. (…………………)
5. It is a land area which is partially covered with water(………………)
6. A water body which contains a mixture of sea water and river water(………)
7. The water that is stored in the cracks and spaces between underground rocks. (………………)

4 -Complete the following sentences:

1. When the speed of water stream becomes high, it can erode deep……….. while when speed of water becomes low it can form……………..
2. Deltas are formed by the deposit of …………..at the end of………..
3. The land that is partially covered with water is called……………..
4. When a river meets a sea, an …………..is formed.
5. When the water is stored in the cracks and spaces of underground rocks ……………is formed.
6. The extinction of some species that live in fresh water is due to the poor …………….of fresh water.
7. The type of water that is found in rivers, most of lakes and streams is a…………… water

5 Give reasons for

1-Deltas are formed at the river's end

……………………………………………………………………..

2. Groundwater is called by this came

……………………………………………………………………..

3. The quality of fresh water affects the life of living organisms live in it?

……………………………………………………………………..

6- What happens if?

1. Water is collected in a low-lying area

………………………………………………………………………………..

2. The quality of fresh water becomes poor

……………………………………………………………………..

3. The river water meets the sea water.

……………………………………………………………………..

Lesson 3

Activity 6 Earth fresh Water:

- Put (√) or (X)

1-Fresh water is an important resource, because humans and animals can only drink fresh water ( )
تعتبر المياه العذبة موردًا مهمًا ، لأن البشر والحيوانات يمكنهم فقط شرب المياه العذبة

2-Plants need fresh water to survive and grow. ( )
-تحتاج النباتات إلى المياه العذبة لتعيش وتنمو.

• *Finding and preserving fresh water is one of the major challenges of this century.*
• *Fresh water resources on Earth are limited, so without the right balance of using fresh water in a community leads to the occurrence of water imbalance causing droughts or floods that impact many organisms*
• .يعد العثور على المياه العذبة والحفاظ عليها أحد التحديات الرئيسية لهذا القرن • .موارد المياه العذبة على الأرض محدودة ، لذا فإن عدم التوازن الصحيح لاستخدام المياه العذبة في المجتمع يؤدي إلى حدوث اختلال في توازن المياه مما يسبب الجفاف أو الفيضانات التي تؤثر على العديد من الكائنات الحية

• Humans use some strategies to control and conserve fresh water for their needs such as:
يستخدم البشر بعض الاستراتيجيات للتحكم بالمياه العذبة والحفاظ عليها لتلبية احتياجاتهم مثل

-building dams across rivers. بناء السدود عبر الأنهار
diverting (changing) the path of water to irrigate crops. تحويل مسار المياه لري المحاصيل

• These human activities cause imbalance of water that leads to:
تتسبب هذه الأنشطة البشرية في اختلال توازن المياه مما يؤدي إلى

- drought (shortage of water) in some places. الجفاف (نقص المياه) في بعض الأماكن
-flooding in some other places. فيضانات في بعض الأماكن الأخرى



Watershed: *It is an area of land where water from different sources flows towards a common location usually an ocean, a sea or other large water body.*
مستجمعات المياه :إنها مساحة من الأرض تتدفق فيها المياه من مصادر مختلفة نحو موقع مشترك عادة ما يكون محيطًا أو بحرًا أو أى جسم مائى كبير آخر.

The study of freshwater systems focuses on the balance of water in a watershed, where

When there is more rainfall, the level of water in rivers or streams will increase causing floods When there is too little rainfall, the level of water in rivers or streams will decrease so these water bodies may dry up causing drought
But, when there is water balance, rivers or streams will have a constant source of fresh water.

تركز دراسة أنظمة المياه العذبة على توازن المياه في مستجمعات المياه ، حيث عندما يكون هناك المزيد من الأمطار ، سيزداد مستوى المياه في الأنهار أو الجداول مما يؤدي إلى حدوث فيضانات.عندما يكون هناك القليل من الأمطار ، سينخفض مستوى المياه في الأنهار أو الجداول وبالتالي قد تجف هذه المسطحات المائية مسببة الجفاف ولكن عندما يكون هناك توازن مائي ، فإن الأنهار أو الجداول سيكون لها مصدر ثابت للمياه العذبة.

Mr.-Alifaz .N .Tadrous
01005136959-/-1222978682

Check your understanding

Complete the following sentences using these words:

(Flooding- watershed-drought-decrease-increase)

1. An area of land where all the water flows to a common location is called……………

2. When there is more rainfall, the level of water in rivers or streams will …………..causing……………..

3-When there is too little rainfall, the level of water in rivers or streams will ………… so these water bodies may dry up causing……………

Activity 6 Watershed Predictions تنبؤات مستجمعات المياه

A watershed can help scientists understand how the water bodies in an area interact with one another.

Tributaries الروافد *: They are small water bodies such as small creeks or streams that flow into bigger rivers. affect people, plants and animals that live near or in these tributaries.*

.هي مسطحات مائية صغيرة مثل الجداول أو الجداول الصغيرة التي تتدفق إلى أنهار أكبر :
تؤثر على الأشخاص والنباتات والحيوانات التي تعيش بالقرب من هذه الروافد أو فيها .

• As you have studied before that water bodies are connected with other, we can conclude that:

Tributaries as small creeks or streams الروافد مثل الجداول الصغيرة أو ...	Flow into →	Bigger rivers انهار كبيرة	Flow into →	Larger water bodies as bays, seas and oceans. المسطحات المائية أكبر مثل الخلجان والبحار والمحيطات.

• What happens upstream in a watershed affects the water bodies downstream.

ماذا يحدث عند المنبع في مستجمعات المياه يؤثر على المسطحات المائية في اتجاه مجرى النهر

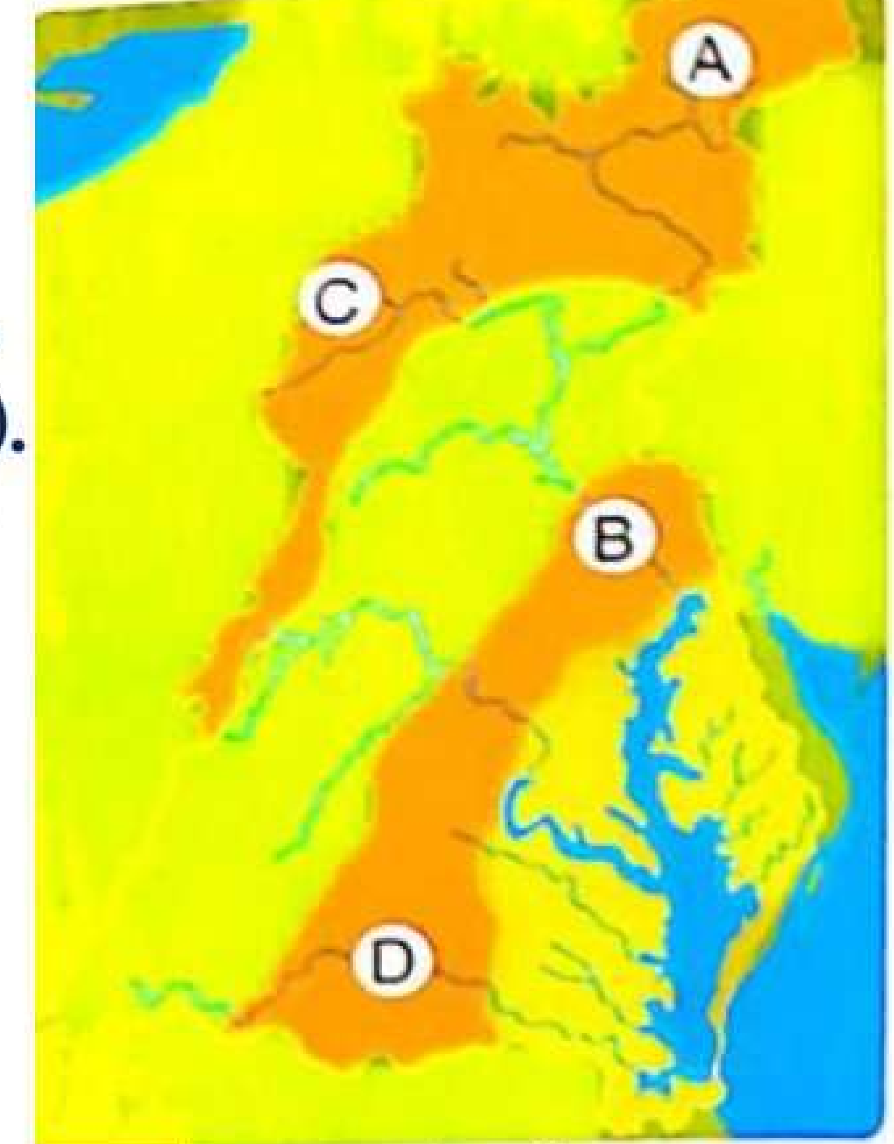
1. Upstream *is the place where a river starts*

2. Downstream *is the place where a river ends*

المصب هو المكان الذي ينتهي فيه النهر .2المنبع هو المكان الذي يبدأ فيه النهر .1

֍ We are going to use the following figure that represents a watershed map to show how water bodies will be affected by some human activities that occur nearer to upstream and downstream such as:

سنستخدم الشكل التالي الذي يمثل خريطة مستجمعات المياه لإظهار كيفية تأثر المسطحات المائية ببعض الأنشطة البشرية التي ֍ تحدث بالقرب من المنبع والمصب مثل:



Remember

The blue color on maps represents water bodies

1-If a factory is built near a tributary at the area A.

-The factory waste will affect the tributary at area (A). Water in tributary at area A carries the factory waste to other water bodies connected to it causing water pollution.

إذا تم إنشاء مصنع بالقرب من رافد في .ستؤثر مخلفات المصنع على الرافد بمنطقة (أ) المياه في الرافد في المنطقة (أ) تنقل نفايات المصنع إلى المسطحات المائية 1- .منطقة أ الأخرى المرتبطة بها مما يتسبب في تلوث المياه.

2-If a dam is built across a tributary at area (B)

-The dam will hold the water behind it and this causes a change in the amount of water in other water bodies connected to this tributary.

- 2.إذا تم إنشاء سد عبر أحد الروافد في منطقة (ب) سيحتفظ السد بالمياه خلفه وهذا يتسبب في تغيير كمية المياه في المسطحات المائية الأخرى المتصلة بهذا الرافد.

3-If there is a farm using chemical fertilizers near a tributary at area C.

-The farm waste will affect the tributary at area (C) The water in tributary at area C carries the farm waste that leak to other water bodies connected to it causing water pollution.

3- .إذا كانت هناك مزرعة تستخدم الأسمدة الكيماوية بالقرب من أحد الروافد بالمنطقة ج- ستؤثر نفايات المزرعة على الرافد في تحمل المياه الموجودة في الرافد في المنطقة ج مخلفات المزرعة التي تتسرب إلى المسطحات المائية الأخرى .المنطقة (ج) المرتبطة بها مما يتسبب في تلوث المياه.

4-If a trash dump is established near a tributary at area D.

-The litter of a trash dump will be blown into the water of tributary at area D. -On windy days, the water in tributary at area D carries the litter into other water bodies connected to it causing water pollution.

.4- .إذا تم إنشاء مكب نفايات بالقرب من رافد بالمنطقة د- سيتم تفجير القمامة من مكب النفايات في مياه الروافد في المنطقة د القمامة إلى المسطحات المائية الأخرى المتصلة بها مما يتسبب في D في الأيام العاصفة ، تنقل المياه الموجودة في الرافد في المنطقة - تلوث المياه.

Check your understanding **Put (√) or (X)**

1. The human activities that take place in water cannot affect people, plants and animals that live near or in water streams ( )

2. Small water bodies such as creeks or streams that flow into bigger rivers are called tributaries. ( )

3. Downstream is the place where a river ends. ( )

Mr.-Alifaz .N .Tadrous
01005136959-/-1222978682

Exercises on Lesson (3)

1 -Choose the correct answer :

1. Most of water on Earth is

a. a mixture of fresh and salt water that is found in estuaries.
b. fresh water that is found underground.
c salt water that is found in oceans and seas.
d. fresh water that is found in lakes.

2. The area of land where all the water flows to a common location as oceans called……………

a. tributary b. estuary. c. wetland d. watershed

3. The level of water in a river may increase causing flooding, when there is more………………

a. rainfall. b. wind c. sunlight d sediments,

4. Tributary usually ends by the flowing of its water into bigger

a. ocean b. sea. c. river. d. lake.

5. The correct flowing of water bodies that are connected with others is tributaries

a bigger rivers → tributaries → oceans
b. tributaries → bigger rivers → oceans
c. oceans. → tributaries → bigger rivers
d. bigger rivers → oceans → tributaries

6. All the following reasons cause water pollution in a river, except

a litter of a nearby trash dump b. waste of a nearby factory
c chemical fertilizers of a nearby farm. d. building a dam across the river

7. Which of the following can pollute the water of a tributary by the effect of wind blowing ?

a Liquid waste materials of factories, b. Water that flows through dams.
c. Light litter of trash dumps. d. Sediments in the water of rivers

2- Put (√) or (X)

1. We must conserve fresh water, because it is limited on Earth. ( )
2. Building factories is from human strategies to control and conserve fresh water. ( )
3. When there is more rainfall, the level of water in rivers will decrease causing flooding ( )
4. The water of tributaries flow directly into seas and oceans. ( )
5. Upstream is the place where a river starts. ( )
6. Waste produced from factories that are built near a watershed can affect the quality of water in downstream. ( )
7. Dam can hold the water behind it which causes a change in the amount of water in a water body. ( )

3-Write the scientific term of each of the following:

1. It is an area of land where all the water flows to a common location usually an ocean, a sea or other large water body. (………….)

2. They are small water bodies such as small creeks or streams that flow into bigger rivers (………….)

3. A building established across a river which can hold water behind it. (………….)

4-Complete the following sentences using the words below:

(chemical fertilizers - bays – decrease- creeks - imbalance-seas - -dams-streams - drought)

1. Some human activities may cause water………….. , that leads to drought or causing flooding of water bodies.

2. When the rate of rainfall decreases, the level of water in rivers will ……………….causing ……………

3. Tributaries are considered as small…………or ……….. that flow into bigger rivers then into large water bodies as ………..and………….

4. A farm that is found near a tributary may cause pollution to the water body if this farm using………………..

5. Building........... across a tributary can change the amount of water in it.

5- Give reasons for:

1. Scientists tend to preserve freshwater sources on Earth.

……………………………………………………………………..

2. Farms near tributaries may cause water pollution.

……………………………………………………………………..

6- What happens if....?

1. The rate of rainfall increases on a river.

……………………………………………………………………..

2. A trash dump is established near a tributary that is connected with a river.

……………………………………………………………………..

Lesson 4

Activity 8 Conservation, Preservation and Sustainability

الحفظ والمحافظة والاستدامة

The following table shows some things made from natural resources:

Natural resources	Objects made from natural resources
Trees الأشجار	*Paper is made from trees* الورق مصنوع من الأشجار
Oil products المنتجات النفطية	*Plastic is made from oil products* البلاستيك مصنوع من المنتجات النفطية
Plant and animal products: المنتجات النباتية والحيوانية	*Clothes are made from plant such as cotton and animal products such as wool of sheeps* الملابس المصنوعة من النباتات مثل القطن والمنتجات الحيوانية مثل صوف الأغنام

> **Humans can conserve natural resources in different ways such as:**

1. Preservation. 2. Sustainability.

1.الحفظ 2. الاستدامة. :- يمكن للبشر الحفاظ على الموارد الطبيعية بطرق مختلفة مثل

1 - Preservation الحفظ

Preservation of resources means restricting access (control reaching) of humans to these natural resources or using them.

يعني الحفاظ على الموارد تقييد وصول (وصول) البشر إلى هذه الموارد الطبيعية أو استخدامها.

Example of resources preservation: مثال على الحفاظ على الموارد

Countries prevent using or developing of natural resources in some protected areas of land such as:

تمنع البلدان استخدام أو تطوير الموارد الطبيعية في بعض المناطق المحمية من الأرض مثل

- Ras Mohammed *Protectorate in South Sinai.* محمية رأس محمد بجنوب سيناء

-Wadi Al-Hitan *Protectorate in Fayoum.* محمية وادي الحيتان بالفيوم

The following table shows the results of overusing (depletion) some natural resources more quickly than they can be replaced:

Natural resources الموارد الطبيعية	*Results when using them more quickly* النتائج عند استخدامها بسرعة أكبر
الأسماك **Fish**	*If fish are **eaten by humans** (overfishing) **more than they are replaced by their reproduction** in oceans and seas, they **become rare** and fishing will **decrease**.* - إذا أكل الإنسان الأسماك (الصيد الجائر) أكثر مما تم استبدالها بتكاثرها في المحيطات والبحار ، فإنها تصبح نادرة ويقل الصيد
المياه الجوفية **Groundwater**	*If groundwater of wells are **used faster than they are replaced by rains**, the groundwater **will run out** and the **wells** will **become dry.*** إذا تم استخدام المياه الجوفية للآبار بشكل أسرع مما تم استبداله بهطول الأمطار ، فسوف تنفد المياه الجوفية وتجف الآبار

2- Sustainability الاستدامة

Sustainability is an important way of resources conservation.

•*Sustainability means using resources in a way that does not negatively affect the future supply of these resources.*

• الاستدامة هي طريقة مهمة للحفاظ على الموارد.

الاستدامة تعني استخدام الموارد بطريقة لا تؤثر سلبًا على العرض المستقبلي لهذه الموارد.

Note

Preservation *of natural resources means prevent using or developing natural resources in special areas.*

But, when people manage the use of the natural resources without negative affect their amount in future this is called sustainability.

الحفاظ على الموارد الطبيعية يعني منع استخدام أو تطوير الموارد الطبيعية في مناطق خاصة.

ولكن عندما يدير الناس استخدام الموارد الطبيعية دون أن يؤثر ذلك بشكل سلبي على مقدارها في المستقبل ، فإن هذا يسمى الاستدامة.

Example of resources sustainability:

Cows feeding (grazing) on grass in a field where grass grows slowly.

Unsustainable situation وضع غير مستدام	Sustainable situation وضع مستدام
If cows are placed in many small areas of grass they began eating all grass before new grass could grow in these areas. إذا تم وضع الأبقار في العديد من المساحات الصغيرة من العشب ، فإنها تبدأ في أكل كل العشب قبل أن ينمو العشب الجديد في هذه المناطق.	*If cows are placed in one large area of grass so, the cows still have more food.* إذا تم وضع الأبقار في مساحة واحدة كبيرة من العشب ، فلا يزال لدى الأبقار المزيد من الطعام
This causes the disappearance of grass in these areas and the cows will be very hungry. هذا يتسبب في اختفاء العشب في هذه المناطق وستكون الأبقار جائعة جدا.	*This causes the grass to grow back in other areas.* هذا يتسبب في نمو العشب مرة أخرى في مناطق أخرى.

Note **Resource sustainability is affected by many factors such as:**

Overpopulation. Pollution - Unequal distribution of resources

Overuse (overconsumption) or damage of resources.

تتأثر استدامة الموارد بالعديد من العوامل مثل زيادة السكان :التلوث التوزيع غير المتكافئ للموارد

الإفراط في الاستخدام أو الإضرار بالموارد

Renewable does not mean unlimited متجدد لا يعني غير محدود

Natural resources can be classified into: يمكن تصنيف الموارد الطبيعية إلى

1-Renewable resources *such as water, plants, animals... etc.*

الموارد المتجددة كالمياه والنباتات والحيوانات ..... إلخ

2-Nonrenewable resources *such as oil, coal... etc.* الموارد غير المتجددة كالنفط والفحم ... إلخ

Renewable resources can be used up if people don't use them wisely.

يمكن استهلاك الموارد المتجددة إذا لم يستخدمها الناس بحكمة.

Examples:

1-When fresh water (renewable resource) on Earth is polluted, it becomes undrinkable.

1- عندما تتلوث المياه العذبة (مورد متجدد) على الأرض ، فإنها تصبح غير صالحة للشرب.

2- Pollution from burning of nonrenewable resources like coal and oil leads to soil pollution that causes the death of plants and animals (renewable resources).

2- التلوث الناتج عن حرق الموارد غير المتجددة مثل الفحم والنفط يؤدي إلى تلوث التربة الذي يتسبب في موت النباتات والحيوانات (الموارد المتجددة).



3- Cutting down too many trees (renewable resource) leads to deforestation so, water and wind can carry away soil causing soil erosion.

3- قطع الكثير من الأشجار (الموارد المتجددة) يؤدي إلى إزالة الغابات ، لذلك يمكن للمياه والرياح أن تنقل التربة وتتسبب في تآكل التربة.



Check your understanding 1-Put (√) or (X)

1. Control reaching of humans to natural resources leads to conservation of these resources. (   )

2. Sustainability don't require management of how a resource is used. (   )

2-Write the scientific term of each of the following:

1. The action of control reaching of humans to the natural resources or using them. (……………)

2. It means using resources in a way that does not negatively affect the future supply of these resources. (……………)

Activity 8 How Much Water Do You Use?

• Drinking water is important for humans to survive, but there are many activities in our daily life that require water such as:

Taking a shower. -Washing hands. -Cooking food.

-Brushing teeth. -Flushing a toilet. -Watering plants

شرب الماء مهم لبقاء الإنسان على قيد الحياة ، ولكن هناك العديد من الأنشطة في حياتنا اليومية التي تتطلب الماء مثل: الاستحمام -غسل الأيدي - طبخ الطعام -سقي النباتات- تنظيف المرحاض - تنظيف الاسنان

The following tables show how you can calculate the average amount of water that a person use in some daily activities by two different methods:

• First method:

Activity requires water	Number of minutes to do this activity each time	Multiply	Amount of water used each minute	Equal	Total amount of water used to do this activity each time
Taking a shower	10 minutes	×	7 liters	=	70 liters
Brushing teeth with water running	4 minutes	×	6 liters	=	24 liters

Mr.-Alifaz .N .Tadrous
01005136959-/-1222978682

Second method:

Activity requires water	Number of times you repeat this activity in one day	Multiply	Amount of water used to do this activity each time	Equal	Total amount of water used to do this activity in one day
Flushing a toilet	*4*	×	*5 liters*	=	*20 liters*
Washing hands	*6*	×	*4 liters*	=	*24 liters*

The following table shows the average of total amount of water used t by a family formed of 4 members:

Activity requires water	Total amount of water used to do this activity in one day (from previous table)	Multiply	Number of family members	Equal	Total amount of water for the family to do this activity in one day
Flushing a toilet	*20 liters*	×	*4*	=	*80 liters*
Washing hands	*24 liters*	×	*4*	=	*96 liters*

From the previous tables we can observe that many people use much water in their daily activities so, we must conserve water during our daily activities by changing our habits such as:

من الجداول السابقة نلاحظ أن الكثير من الناس يستخدمون الكثير من الماء في أنشطتهم اليومية لذلك يجب علينا الحفاظ على المياه خلال أنشطتنا اليومية من خلال تغيير عاداتنا مثل: -

1-Decrease the time of some activities like taking a shower. **تقليل وقت بعض الأنشطة مثل الاستحمام**

2-Turn off water during some activities like brushing teeth. **2 أغلق الماء أثناء بعض الأنشطة مثل غسل الأسنان**

Check your understanding

If you have only 40 liters of water to do all activities in one day.

Choose three from the following activities you will do by this little amount of water.........



a, washing hands. *b. washing clothes.*
c. brushing teeth. *d. washing dishes.*
e. flushing a toilet.

Exercises on Lesson (4)

1 -Choose the correct answer :

1. Paper of books are made from

a. oil products. b. wool of sheeps. c. trees. d. cotton.

2. Plastic cup is made from ....products

a. plant b. animal c. oil d. human

3. Prevent developing of Ras Mohammed Protectorate is considered as an example of ....

a. preservation b. pollution c. sustainability d. consumption

4. If some rabbits are placed in only one large area of grass, this is considered as an example of..

a. deforestation of green areas. b. preservation

c. sustainability d. pollution

5. Among the factors that help us to make resources sustainability is.......

a. overpopulation. b. overuse of resources.

c. damage of resources. d. pollution control.

6. Cutting down too many trees of forests leads to.........

a. deforestation and soil deposition. b. overpopulation and soil erosion.

c. deforestation and soil erosion. d. overpopulation and soil deposition

7. Family (A) consists of 3 members and family (B) consists of 4 members, if you know that each member use 20 liters to washing hand daily, so the total amount of water that is used by family (A) is ......that is used by family (B).

a. more than b. less than c. double d. equal to

2 Choose from column (B) what suits it in column (A):

(A)	(B)
1. Cotton	a. can be used in making plastic.
2. Oil products	b. can be used in making paper.
3. Trees	c. can be used in making clothes.
	d. can be used in making cans.

3- Put (√) or (x):

1. Preservation and sustainability are ways to conserve natural resources. ( )
2. When people manage the use of natural resources to make them available in future, this is called sustainability. ( )
3. Placing cows in many small grass areas is considered as unsustainable situation ( )
4. Soil pollution causes the death of plants and animals, ( )
5. You must decrease the time of taking your shower to conserve water, ( )
6. You can conserve water by leaving the tap open during brushing your teeth( )

4- Write the scientific term of each of the following:

1. The action of control reaching of humans to the natural resources or using them. (......................)

2. It means using resources in a way that does not negatively affect the future supply of these resources. (…………………..)

5- Complete the following sentences:

1. Groundwater is replaced by…………….
2: The run out of……… causes wells to become dry.
3. Plastic is made from……… while paper and wood are made from………
4. Clothes can be made from …………products or……….. products
5. If we use fossil fuels wisely without negative affect their amount in future, this called……………...
6. To conserve water, we can ………. time of washing our hands.

6-Give reasons for:

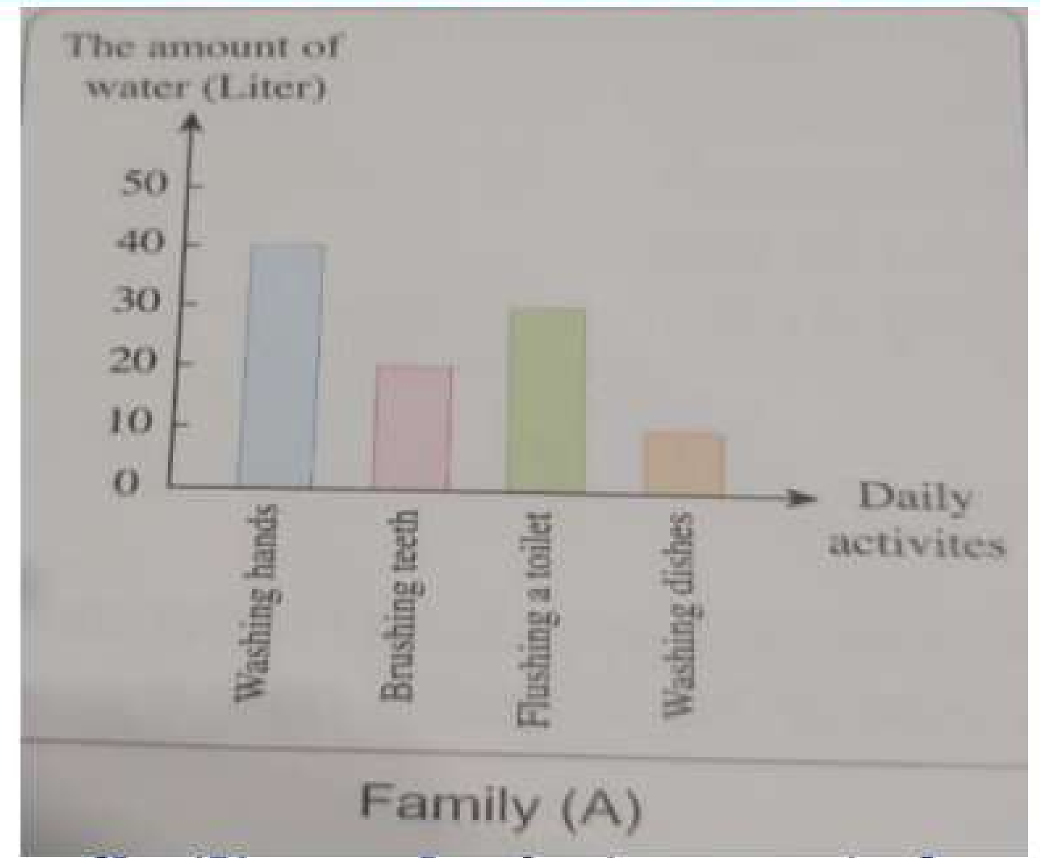
1. Countries prevent using or developing natural resources in some areas of land.

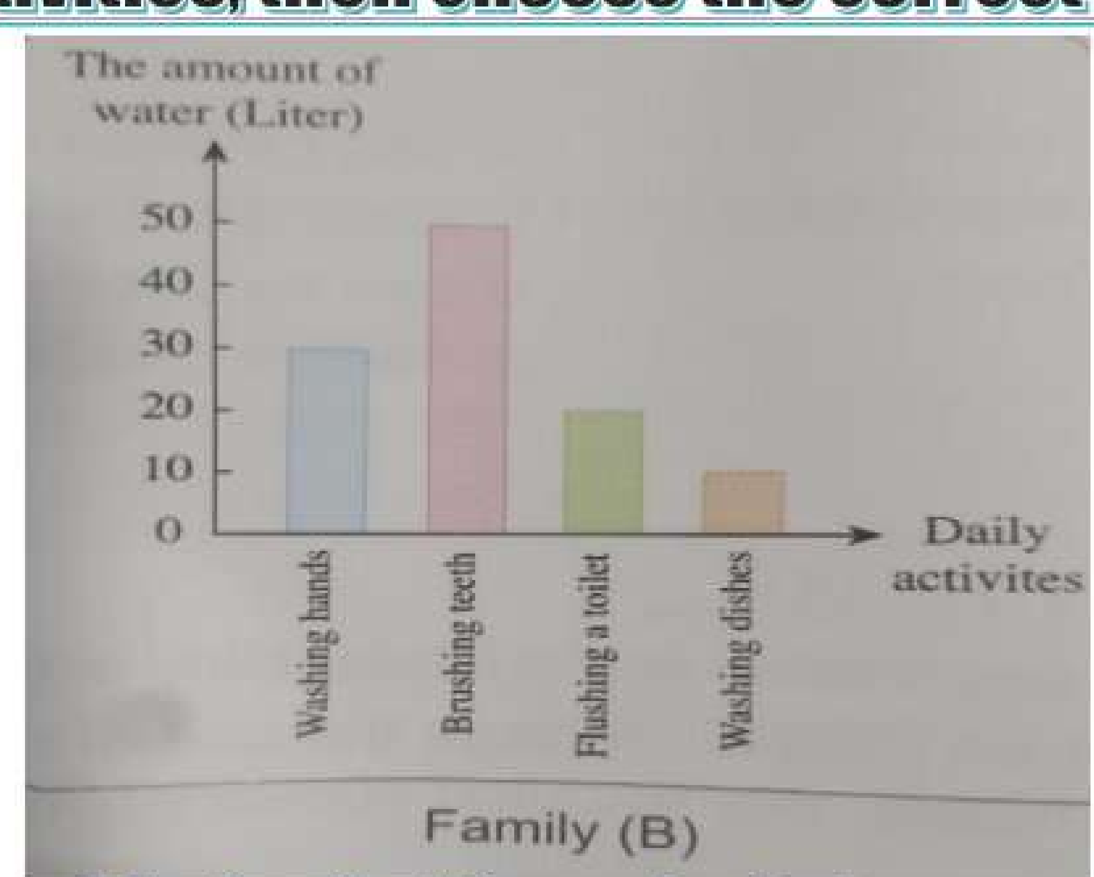
……………………………………………………………………………..

2. We should turn of water during washing dishes.

……………………………………………………………………………..

7- Look at the following graphs which show the amount of water that is used by families to do some of the same daily activities, then choose the correct answer





1. Family (A) uses largest amount of water in…….while family (B) uses largest amount of water in.
   a washing hands-washing dishes. b. brushing teeth-flushing a toilet
   c. flushing a toilet-brushing teeth d washing hands-brushing teeth
2. The total amount of water that is used by family (A) in brushing tooth and flushing a toilet is equal to that is used by family (B) in
   a washing hands and brushing tooth. b. brushing teeth and flushing a toilet
   c. washing hands and flushing a toilet. d. washing dishes and washing hands
3. The total amount of water that is used by family (A) is ……..that is used by family (B).
   a. larger than b. smaller than c. equal to d. two times
4- If you know that the two families have the same number of members so according to the previous graphs
   a family (A) conserves water more than family (0)
   b. family (B) conserves water more than family (A)
   c. both families do not conserve water
   d. both families use the same amount of water

Lesson 5

Activity 10 Drinking Water ماء الشرب

Look at the opposite picture, then Put (√) or (x):

1. When fresh water on Earth is polluted it becomes undrinkable ( )

2 Water is considered nonrenewable natural resource ( )

-**Fresh water is a limited renewable natural resource** *which is very important for all living organisms to survive including human who uses water in many activities in his daily life.*

المياه العذبة هي مورد طبيعي متجدد ومحدود وهو مهم للغاية لجميع الكائنات الحية للبقاء على قيد الحياة بما في ذلك الإنسان الذي يستخدم الماء في العديد من الأنشطة في حياته اليومية

-Human creates many methods to filter water to recycle wastewater polluted water to be used again in some other purposes.

.ابتكر الإنسان طرقًا عديدة لتصفية المياه لإعادة تدوير المياه العادمة الملوثة لاستخدامها مرة أخرى في بعض الأغراض الأخرى

Note *Recycle wastewater means removing harmful materials from water*

ملاحظة: إعادة استخدام مياه الصرف الصحي تعني إزالة المواد الضارة من المياه

Making a water filter using some simple materials in order to remove harmful waste materials from polluted water

عمل فلتر مياه باستخدام بعض المواد البسيطة لإزالة المخلفات الضارة من المياه الملوثة

Tools *Scissors - Plastic bottle - Cotton balls - Charcoal - Sand*

أدوات مقص- زجاجة بلاستيكية- كرات قطنية -فحم- رمل

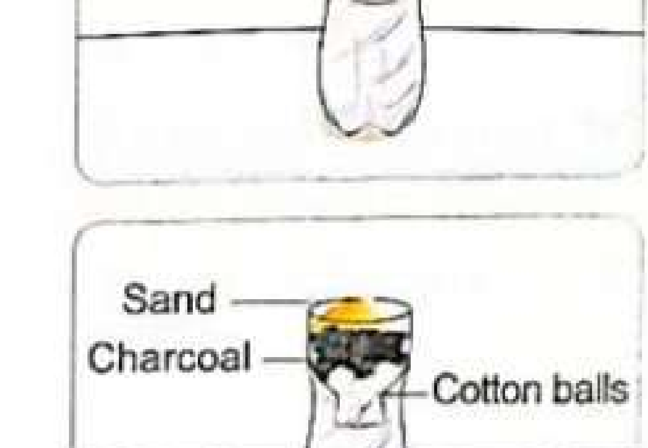
Note *You can make dirty water by adding some mud to clear water.*

.ملاحظة: يمكنك عمل ماء متسخ عن طريق إضافة بعض الطين لتنقية المياه

▸ Steps

1. Cut off the bottom of the plastic bottle and place it upside down on the other part of the bottle

اقطع الجزء السفلي من الزجاجة البلاستيكية وضعه مقلوبًا على الجزء الآخر من الزجاجة



2. Make a layer of cotton balls in the cut bottle.

اصنع طبقة من كرات القطن في الزجاجة المقطوعة

3. Put charcoal above the cotton balls and put the sand above the charcoal. نضع الفحم فوق كرات القطن ونضع الرمل فوق الفحم

4. Pour the dirty water in the filter. صب الماء المتسخ في الفلتر.



▸ Observations. المشاهدة-.

The filter removes most of dirt from dirty water. يزيل الفلتر معظم الأوساخ من المياه المتسخة

-The filtered water moves down at the bottom of the container.

يتحرك الماء المصفى لأسفل في قاع الحاوية

▸ Conclusion *Water filters are used to remove harmful materials from polluted water to get filtered water that human can use in many purposes.*

.الخلاصة تُستخدم فلاتر المياه لإزالة المواد الضارة من المياه الملوثة للحصول على مياه مصفاة يمكن للإنسان استخدامها في العديد من الأغراض

Choose the correct answer *1. We can use all the following objects to make a simple water filter, except a. cotton. b. mud. c. charcoal. d. sand*

Exercises on Lesson (5)

1-Choose the correct answer :

1- ……can be used to recycle wastewater to be used again in human activities

a. Bottles b. Filters c. Dams d. Generators

2 All the following materials can be used to filter wastewater in simple water filter except

a cotton b. wood c charcoal d sand

3-In simple water filter, wastewater must pass through

a. cotton charcoal the sand. b. cotton, sand, mud

c. charcoal cotton – sand. d. sand charcoal the cotton

4- ………process is used to get filtered water from polluted water

a Recycling b. Sustainability c. Preservation d. Conservation

5. Sand, charcoal and cotton can be used to remove all the following materials from wastewater, except

.a small pieces of plastic. b. salt dissolves in water

.c. small particles of mud d. small pieces of rocks

2-Put (√) or (x):

1-Recycling of wastewater means removing waste materials from it ( )

2. Cotton can be used as a filter to remove waste from water ( )

3-Water is considered as a nonrenewable natural resource. ( )

4. Adding some of mud to a clear water can pollute it ( )

5-Dams can be used to filter polluted water to be used again .( )

3-Complete the following sentences using the words below

(harmful-charcoal - mud-filter-sand)

1-Human can .... water to recycle wastewater to be used again

2-Cotton , ……..and………. can be used in making a simple water filter

3- Water filters are used to remove……… materials from polluted water

4. Clear water can be polluted if it is mixed with…………….

4-Give a reason for the following

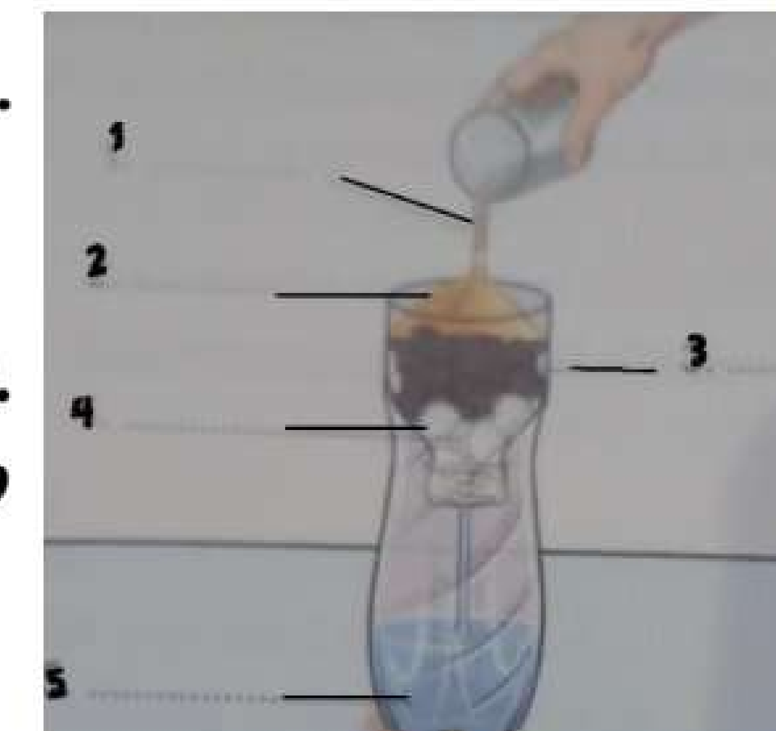
Scientists recycle fresh wastewater to get filtered water again.

…………………………………………………………………………

5- What happens if you mix clear water with small amount of mud?

…………………………………………………………………………

6- Look at the following figure, then answer the questions below:



B. Label the figure using the following words:

(Charcoal-Wastewater-Cotton-Filtered water - Sand).

B. The tool above shows a simple ……….and it is used to remove……… materials from wastewater. (**Complete**)

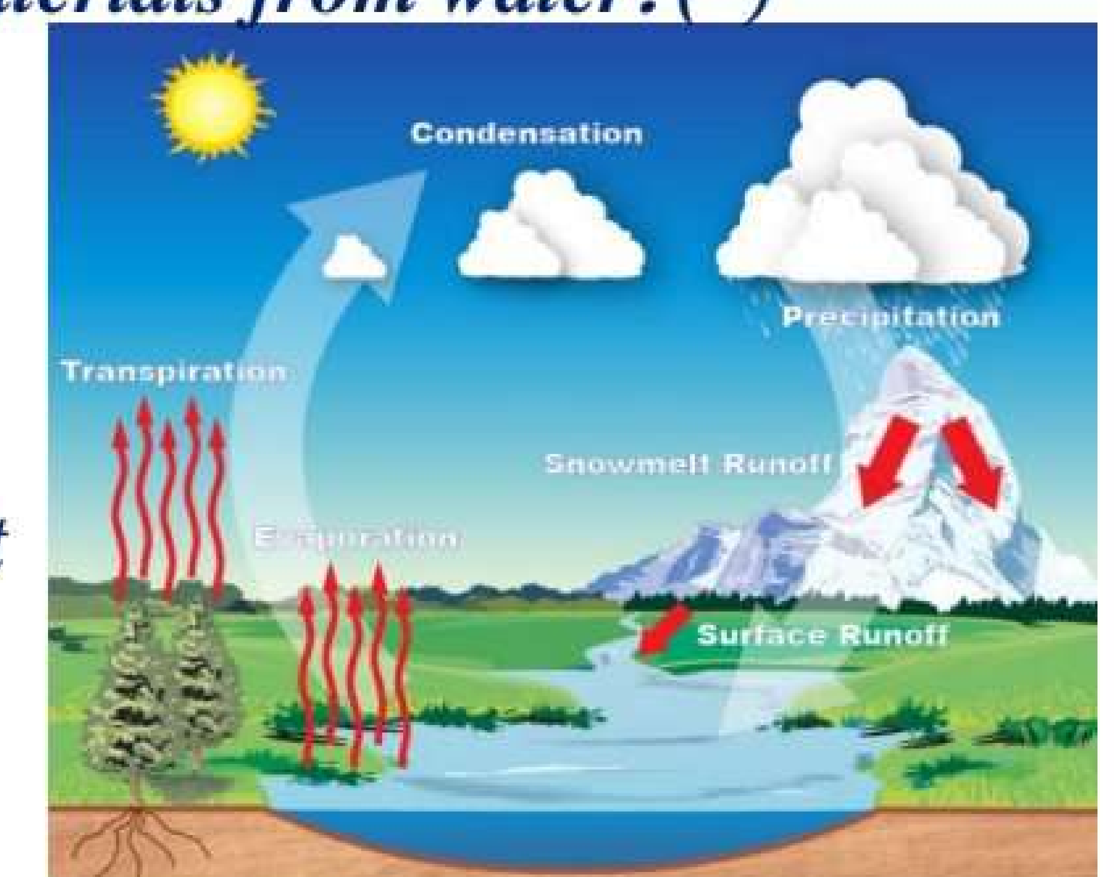
Lesson 6

Activity 12 Stem in Action

▸ -Put (√) or (x): 1- Conserving water occurs by changing our habits such as increasing the time of taking a shower ( )

2- Recycle wastewater means removing harmful materials from water. ( )

Recycling water إعادة تدوير المياه



Solar energy plays an important role in the water cycle in nature where, solar energy helps the Earth to recycle and reuse water, Human also can recycle wastewater and reuse it in many purposes.

تلعب الطاقة الشمسية دورًا مهمًا في دورة المياه في الطبيعة حيث تساعد الطاقة الشمسية الأرض على إعادة تدوير المياه وإعادة استخدامها يمكن للإنسان أيضًا إعادة تدوير مياه الصرف الصحي وإعادة استخدامها في العديد من الأغراض

Note ملحوظة Wastewater is the water that has already been used in homes and different industries مخلفات الماء هي المياه التي تم استخدامها بالفعل في المنازل والصناعات المختلفة.

Wastewater engineers مهندسو الصرف الصحي

They are special kinds of scientists and some of them work in water treatment plants such as Bahr Al-Baqar wastewater treatment plant in Egypt.

هم أنواع خاصة من العلماء وبعضهم يعمل في محطات معالجة المياه مثل محطة معالجة مياه الصرف الصحي في بحر البقر في مصر.

The role of wastewater engineers in recycling wastewater

دور مهندسي الصرف الصحي في إعادة تدوير مياه الصرف الصحي

They design tools that provide us with clean water إنهم يصممون الأدوات التي تزودنا بالمياه النظيفة

They always observe the water quality and check for the amount of pollutants in water إنهم يراقبون دائمًا جودة المياه ويتحققون من كمية الملوثات في الماء.

They decide where to build water treatment plants, observe and check each step in water treatment process.

يقررون مكان بناء محطات معالجة المياه ، ويلاحظون ويتحققون من كل خطوة في عملية معالجة المياه

After water treatment process occurs, wastewater engineers test the treated water to make sure it is safe before the water is released to rivers and lakes or used by humans

بعد حدوث عملية معالجة المياه ، يقوم مهندسو المياه العادمة باختبار المياه المعالجة للتأكد من سلامتها قبل تصريف المياه إلى الأنهار والبحيرات أو استخدامها من قبل البشر

Note ملحوظة 1. Water treatment plants recycle wastewater by removing harmful materials from wastewater to reuse it

تقوم محطات معالجة المياه بإعادة تدوير مياه الصرف الصحي عن طريق إزالة المواد الضارة من مياه الصرف لإعادة استخدامها

2- There are other works of wastewater engineers such as:

هناك أعمال أخرى لمهندسي الصرف الصحي مثل

They design ways to protect a community from floods. تصميم طرق لحماية المجتمع من الفيضانات

They calculate the amount of drinking water that a community needs.

يحسبون كمية مياه الشرب التي يحتاجها المجتمع .:

Exercises on Lesson (6)

1-Choose the correct answer :

1. ....can be used to recycle wastewater to be used again in human activities.

a. Bottles b. Filters c. Dams d. Generators

2 .All the following materials can be used to filter wastewater in simple water filter, except

a. cotton. b. wood. c. charcoal. d. sand.

3 .In simple water filter, wastewater must pass through

a. cotton then charcoal then, sand.

b. cotton then, sand then, mud.

c. charcoal then, cotton then, sand.

d. sand then charcoal then, cotton.

4-..........process is used to get filtered water from polluted water.

a. Recycling b. Sustainability c. Preservation d. Conservation

5 .Sand, charcoal and cotton can be used to remove all the following materials. from wastewater, except..........

a. small pieces of plastic. b. salt dissolved in water.

c. small particles of mud. d. small pieces of rocks.

6-Water cycle is considered as an example of.............

a. recycling water. b. preservation of water.

c. overusing water. d. conservation of water

7-............. are special kinds of scientists who work on recycling water in water treatment plants.

a. Hydrologists b. Aquatic biologists

c. Wastewater engineers d. Marine biologists

8. All the following may happen to the treated water, except that.......

a. it is used again by humans. b. it is released into air

c. it is released to rivers. d. it is released to lakes

9. All the following are from works of wastewater engineers, except that they

a. design ways to protect a community from floods.

b. calculate the amount of drinking water that a community needs.

c. design tools that provide us with clean water.

d. always check for the amount of fish in water.

2-Put (√) or (x):

1. Hydrologists are scientists that work on recycling wastewater in water treatment plants. ( )

2. Wastewater engineers decide where to build water treatment plants. ( )

3 Wastewater engineers do not test the treated water after finishing the water treatment process ( )

4. In water treatment plants, harmful materials are removed from wastewater to reuse it again ( )

(.......................)

3- Write the scientific term of each of the following:

1. It is the water that has already been used in homes and different industries.

2. Scientists who work in water treatment plants. (…………………)

3. They are stations which recycle wastewater by removing harmful materials from wastewater to reuse it. (…………………)

4-Complete the following sentences

1. Wastewater engineers work in…….plants, and design tools that provide us with clean

2. Wastewater engineers can test the quality of………. by check for the amount of ………. in water

3. After water treatment process,………. engineers test the………. to make sure it is safe.

4. Water treatment plants recycle the ……….by removing harmful materials from it to reuse again,

5. Wastewater engineers design ways to protect communities from…………

5 -Give a reason for the following

1- Scientists recycle fresh wastewater to get filtered water again

………………………………………………………………………………

2- Wastewater engineers test the treated water

………………………………………………………………………………

6 What happens if

you mix clear water with small amount of mud?

………………………………………………………………………………

Concept three (4.1)

Effect of gravity تأثير الجاذبية

Lesson 1

Activity 1 Can You Explain

-**Gravity** *is the force that pulls objects with mass toward the center of Earth.* الجاذبية هي القوة التي تسحب الأجسام ذات الكتلة نحو مركز الأرض

Gravity, *gravity is the force of attraction between objects.* ، الجاذبية هي قوة التجاذب بين الأشياء.

How does gravity affect the movement of objects?
كيف تؤثر الجاذبية على حركة الأجسام؟

The force of gravity **pulls objects down toward the ground**, *such as skydivers fall down toward the ground.*
تسحب قوة الجاذبية الأشياء لأسفل نحو الأرض ، مثل القفز بالمظلات نحو الأرض

The force of gravity **between the Sun and objects** *in the solar system keeps planets revolve in fixed orbits.*
تحافظ قوة الجاذبية بين الشمس والأجسام في النظام الشمسي على دوران الكواكب في مدارات ثابتة

The gravity of the moon *affects the ocean* **tides**. .. تؤثر جاذبية القمر على المد والجزر في المحيط.

Activity 2 Gravity

Girl on bike falling over



Pouring oil



In the images above, we can observe that:

-Both images are similar in that something is going down toward the ground.

-The motion of the girl and the oil toward the ground is due to gravity.
في الصور أعلاه ، يمكننا ملاحظة ما يلي تتشابه الصورتان في أن شيئًا ما ينزل نحو الأرض حركة الفتاة والزيت تجاه الأرض نتيجة الجاذبية

Give a reason for أعط سببا لـ

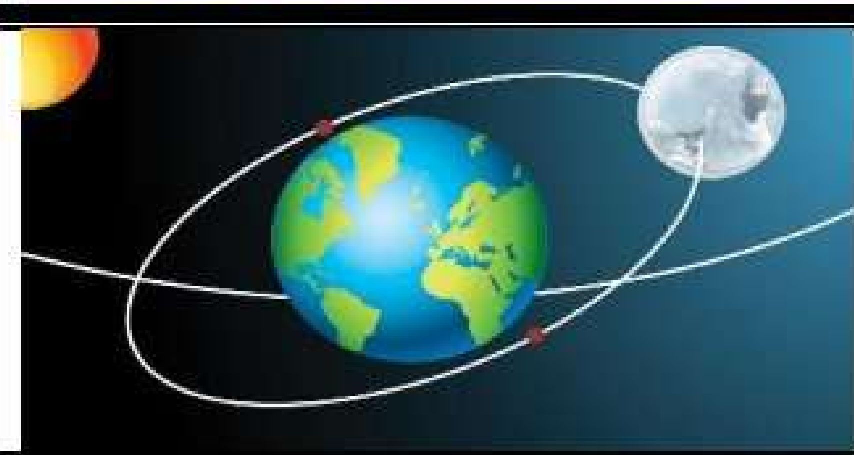
In basketball game, each time the ball is thrown into the air, it falls down toward the ground.

Due to gravity that pulls the ball down toward the ground
في لعبة كرة السلة ، في كل مرة تُلقى فيها الكرة في الهواء ، تسقط باتجاه الأرض.
بسبب الجاذبية التي تسحب الكرة لأسفل نحو الأرض

Check your understanding Put (✓) or (x):

1. *We see gravity when people skydive.* ( )
2. *The moon is revolving around Earth due to gravity between them.* ( )

Activity 3 The Effect of Gravity on the Movement of Objects

Girl on a slide	Revolving of the moon around Earth
	
The force of gravity *is* **pulling** *the* **girl**, *as a result, she moves down the slide.* قوة الجاذبية تسحب الفتاة ، ونتيجة لذلك تتحرك إلى أسفل المنزلق **If there were no gravity:** -**There would be no force** *that pulls the girl downward.* -**The girl** *not be held to the slide.* للأسفل. إذا لم يكن هناك جاذبية .لن تكون هناك قوة تدفع الفتاة - الفتاة أيضًا لن تُحمل على المنزلق.	• **The force of gravity** *is* **pulling** *the* **moon**, *as a result, the moon still revolves in its orbit around Earth.* قوة الجاذبية تسحب القمر ، ونتيجة لذلك لا يزال القمر يدور في مداره حول الأرض **If there were no gravity** *between the moon and Earth, the moon would just float off into space.* إذا لم يكن هناك جاذبية بين القمر والأرض ، فسيطفو القمر في الفضاء

Activity 4 The Effect of Gravity

Gravity جاذبية

- *Gravity pulls objects toward the center of Earth* تسحب الجاذبية الأشياء نحو مركز الأرض
- *Gravity affects two objects even when they do not touch each other, such as the moon and Earth* تؤثر الجاذبية على جسمين حتى عندما لا يتلامسان ، مثل القمر والأرض
- *There is gravitational attraction (or gravitational poll) between Earth and the moon.* هناك جاذبية (أو سحب جاذبية) بين الأرض والقمر

Mass and gravitational force الكتلة وقوة الجاذبية

Gravitational force (gravity) of an object increase as the mass increase and vice versa تزداد قوة الجاذبية (الجاذبية) لجسم ما مع زيادة الكتلة والعكس صحيح

What happens If...? *The mass of the moon becomes twice its real mass.*
ماذا يحدث إذا...؟ كتلة القمر تصبح ضعف كتلته الحقيقية.

The moon would have more gravity, so it would pull closer to Earth and it might even crash into Earth. سيكون للقمر جاذبية أكبر ، لذلك سوف يقترب أكثر من الأرض وقد يصطدم بالأرض

Distance and gravitational force المسافة وقوة الجاذبية

Gravitational force (gravity) decrease, when the distance between two object increases and vice versa. تنخفض قوة الجاذبية (الجاذبية) ، عندما تزداد المسافة بين جسمين والعكس صحيح

What happens If...? ماذا يحدث إذا...؟

The distance between the moon and Earth becomes twice than it is.
تصبح المسافة بين القمر والأرض ضعف ما هي عليه

The gravitational attraction between them would become smaller.
سيصبح قوة التجاذب بينهما أصغر

Exercises on Lesson (1)

1-Choose the correct answer :

1. A boy on a slide moves down toward the ground due to the effect of

a. the boy's height. b. gravity. c friction d. the temperature of air.

2. Gravity keeps the moon in orbit around

a. Sun. b. Earth. c. itself. d. another moon,

3. Gravitational force of Earth is affected by

a. mass and time. b. mass and distance. c. mass only d. distance only.

4. If there is no Earth's gravity, the moon would

a, revolve faster around Earth. b. still orbit Earth.
c. attract to Earth. d. float off into space.

5. All the following are properties of Earth's gravity, except

a. it pushes objects upward. b. it affects the moon.
c. it pulls objects downward. d. it is a type of attraction force.

6. Earth attracts objects towards

a. its center. b. the sky. c. the moon. d. the Sun.

7. Which of the following examples does not clearly explain how the force of gravity pulls objects toward the center of Earth?

a. An apple falls down from a tree onto the soil.
b. A skydiver jumps out of an airplane.
c. A pen moves on a table and drops onto the floor.
d. A rocket moves up toward the sky.

Put (✓) or (x):

1. Gravity pulls objects toward the center of Earth ( )
2. Objects are pushed away of ach other due to gravity ( )
3. Planets in the solar system revolve in fixed orbits due to the gravity between the Sun and planets. ( )
4. If the gravity of Earth disappears the moon will float off into space ( )
5. The gravity of moon affects the ocean tides. ( )
6. As the mass of an object increases, its gravitational attraction decrease ( )
7. Gravity affects the movement of objects ( )
8 two objects don't touch each other, there is no gravity between them ( )
9. The gravitational force of Earth to a person in a flying airplane is smaller than it when the same person stands on the ground 5. The gravity of moon affects the ocean tides. ( )

3- Write the scientific term of each of the following:

1. A force that pulls object down toward the Earth's surface (……………..)
2. A celestial body that orbits the Earth (……………..)
3. A phenomenon takes place in oceans and seas due to gravity of moon(…………..)

4- Complete the following sentences

1. Objects move down from high place toward the ground due to the effect of………………….

2. The moon moves around ……………….due to gravity

3. Gravity pulls objects toward the …………………of Earth.

4. When the distance between the moon and the Earth increases, the gravitational attraction between them………….

5. The gravity of the moon affects the phenomenon of ocean………….

6. if the mass of the moon increases than its real mass, its gravitational attraction will …………….

5 -What happens if?

1. The distance between the moon and Earth increases to twice,

………………………………………………………………………….

2. The mass of the moon decreases to half.

………………………………………………………………………….

6 Give reasons for

1. The moon is attracted to Earth.

………………………………………………………………………….

2. The gravity between two objects is affected by the distance between them

………………………………………………………………………….

3. The force of gravity has an important role the solar system

………………………………………………………………………….

7-The opposite figure shows two apples, one of them has a mass of 50 gm while the mass of the other is 80 g



1. Which one of these apples is affected by Earth's gravity more than the other?

Give a reason for your answer.

………………………………………………………………………….

Because: ……………………………………………………………………….

2. Choose the correct answer:

The gravity of Earth is affected by all of the following expect

a. the mass of the fruit

b, the distance between the fruit and the Earth's surface.

c. the type of the fruit.

Lesson 2

Activity 5 Forces

• *Forces are needed to make things move Force*• القوى اللازمة لتحريك الأشياء القوة:

Forces *It is a pull or a push that is applied to an object*
القوى هو سحب أو دفع يتم تطبيقه على جسم

Motion *means a change in the position of an of an object compared to another object* الحركة تعني تغيير موضع جسم ما مقارنة بجسم آخر

Forces can affect different objects *in two ways which are contact force and noncontact force, where:*
يمكن أن تؤثر القوى على أشياء مختلفة بطريقتين هما قوة الاتصال وقوة عدم الاتصال حيث

-In contact force, *the two objects need to contact each other for the motion of one object. as when you kick a ball, your foot must contact the ball to make it move.*
.قوة التلامس ، يحتاج الجسمان إلى الاتصال ببعضهما البعض لحركة كائن واحد
ـكما هو الحال عند ركل الكرة .يجب أن تلمس قدمك الكرة لتحريكها

-In noncontact force, *the two objects do not need to touch or contact each other for the motion of one object, as the magnet does not need to touch the paper clips to attract them.*
، في حالة عدم التلامس ، لا يحتاج الجسمان إلى اللمس أو الاتصال ببعضهما البعض لحركة كائن واحد ، حيث لا يحتاج المغناطيس .إلى لمس مقاطع الورق لجذبهما

How things move - كيف تتحرك الأشياء

-**Forces** *can pull or push objects in different directions.*
تستطيع القوات سحب أو دفع الأشياء في اتجاهات مختلفة

• **Some forces are weak**, *like the push force needed to move a toy car, while forces are strong, like the push force needed to move a real car*
بعض القوى ضعيفة ، مثل قوة الدفع اللازمة لتحريك سيارة لعبة ، بينما تكون القوى قوية ، مثل قوة الدفع اللازمة لتحريك سيارة حقيقية

Types of forces أنواع القوى

The following examples show the cause and the effect of some different types of forces توضح الأمثلة التالية سبب وتأثير بعض أنواع القوى المختلفة

Examples أمثلة

1 -Magnet *has a kind of invisible force that cannot be seen, known as Magnetism* المغناطيس لديه نوع من القوة غير المرئية التي لا يمكن رؤيتها ، والمعروفة باسم المغناطيسية

Magnetism

It is the force of attraction or repulsion between two magnets or between a magnet and an object
المغناطيسية هي قوة الجذب أو التنافر بين مغناطيسين أو بين مغناطيس وجسم -

Magnet can exert *a* **pulling** *force or a* **pushing** *force using the force of magnetism as follows:*

Pulling force of magnetقوة سحب المغناطيس

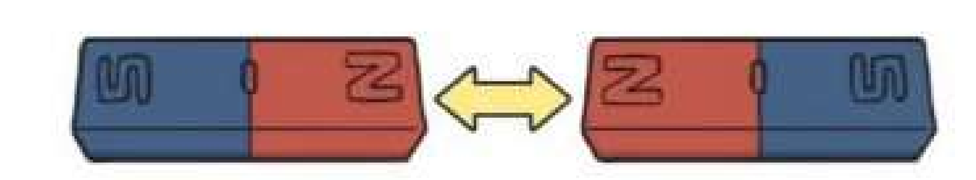
1-Cause: *A magnet pulls paper clips up.*

السبب: يسحب المغناطيس مشابك الورق لأعلى

Effect: *Paper clips move to the magnet.*

التأثير: تتحرك مشابك الورق إلى المغناطيس.

Pushing force of magnetقوة دفع المغناطيس



Cause: *A magnet pushes away another magnet.*

السبب: يدفع المغناطيس مغناطيسًا آخر بعيدًا

Effect: *The other magnet is pushed away.*

التأثير: يتم دفع المغناطيس الآخر بعيدًا.



2-Cause: **Wind** *pushes on the blades of a* **wind turbine**. السبب: تدفع الرياح ريش التوربينات الهوائية

Effect: *Wind turbine blades move.*

التأثير: تتحرك ريش توربينات الرياح.



3-Cause: *Gravity pulls a cup you drop to the floor.*

السبب: تسحب الجاذبية كوبًا تسقطه على الأرض

Effect *The cup falls to the ground.*

التأثير: الكأس يسقط على الأرض.



Note



Gravity can exert only a pulling force, while a magnet can exert a pulling or pushing

Check your understanding Put (√) or (x):

1. Objects don't need force to move. ( )
2. The magnet can exert a pull or a push force. ( )
3. If you drop a cup to the floor, it will fall down toward the ground due to gravity. ( )

Activity 6 What is the gravity

Gravity

It is the force of attraction that exists between objects that have mass
جاذبية إنها قوة الجذب الموجودة بين الأشياء التي لها كتلة

We know gravity is a force because we can see its effects around us, such as when something falls. نعلم أن الجاذبية قوة لأننا نستطيع رؤية آثارها من حولنا ، مثل سقوط شيء ما .

For example: على سبيل المثال

-An egg could slip out of your hand and fall to the floor.
يمكن أن تنزلق البيضة من يدك وتسقط على الأرض

-When you drop a ball or a book, it falls down toward the ground.
عندما تسقط كرة أو كتابًا ، تسقط نحو الأرض

-The force of gravity keeps us from floating into space like that happens with astronauts. قوة الجاذبية تمنعنا من الطفو في الفضاء مثلما يحدث مع رواد الفضاء.

• **In space**, *there are big and small planets, where bigger planets have more gravity than that of smaller planets.*
في الفضاء ، توجد كواكب كبيرة وصغيرة ، حيث تمتلك الكواكب الأكبر جاذبية أكبر من تلك الموجودة في الكواكب الصغيرة. •

• *The force of gravity keeps the planets revolve in their orbits or on fixed paths around the Sun.* • قوة الجاذبية تجعل الكواكب تدور في مداراتها أو في مسارات ثابتة حول الشمس.

On the Earth's surface, objects with large masses have more gravity than that of objects with small masses.
على سطح الأرض ، تمتلك الأجسام ذات الكتل الكبيرة جاذبية أكبر من جاذبية الأجسام ذات الكتل الصغيرة.

Check your understanding- Complete the following sentences:

1. Gravity is the ……….of attraction between objects that have

2. When an egg slips out of your hand, ………. pulls it toward the ground so the egg breaks.

3. Big objects have …………………gravity than small objects

Activity 7 The Force of Gravity

What goes up, must come down ما طار طير وارتفع إلا كما طار وقع

Gravity *changes the direction of anything you throw into the air*
الجاذبية تغير اتجاه أي شيء ترميه في الهواء

Example مثال

-If you throw a ball into the air the ball will go up into the air and then fall down back to the ground every time.
إذا رميت كرة في الهواء سترتفع الكرة في الهواء ثم تسقط مرة أخرى على الأرض في كل مرة

-As the ball flies through the air, its movement changes where, at first the ball is moving up then its direction changes as it starts falling down toward the ground.
عندما تطير الكرة في الهواء ، تتغير حركتها حيث تتحرك الكرة في البداية لأعلى ثم يتغير اتجاهها عندما تبدأ في السقوط نحو الأرض.

-The ball's direction changes because the gravity force is acting on the ball
يتغير اتجاه الكرة لأن قوة الجاذبية تؤثر على الكرة -

Gravity and mass الجاذبية والكتلة

Gravity does not only act on falling or moving objects but also, it acts on objects that do not move, such as a boy sits on a chair or a book on a shelf

لا تعمل الجاذبية على سقوط الأجسام أو تحريكها فحسب ، بل تعمل أيضًا على الأشياء التي لا تتحرك ، مثل صبي يجلس على كرسي أو كتاب على رف

•All objects have gravity because they all have mass. • . كل الأجسام لها جاذبية لأن جميعها لها كتلة

• Objects with greater mass exert greater force on objects around them as in the Earth-and-moon system, where:

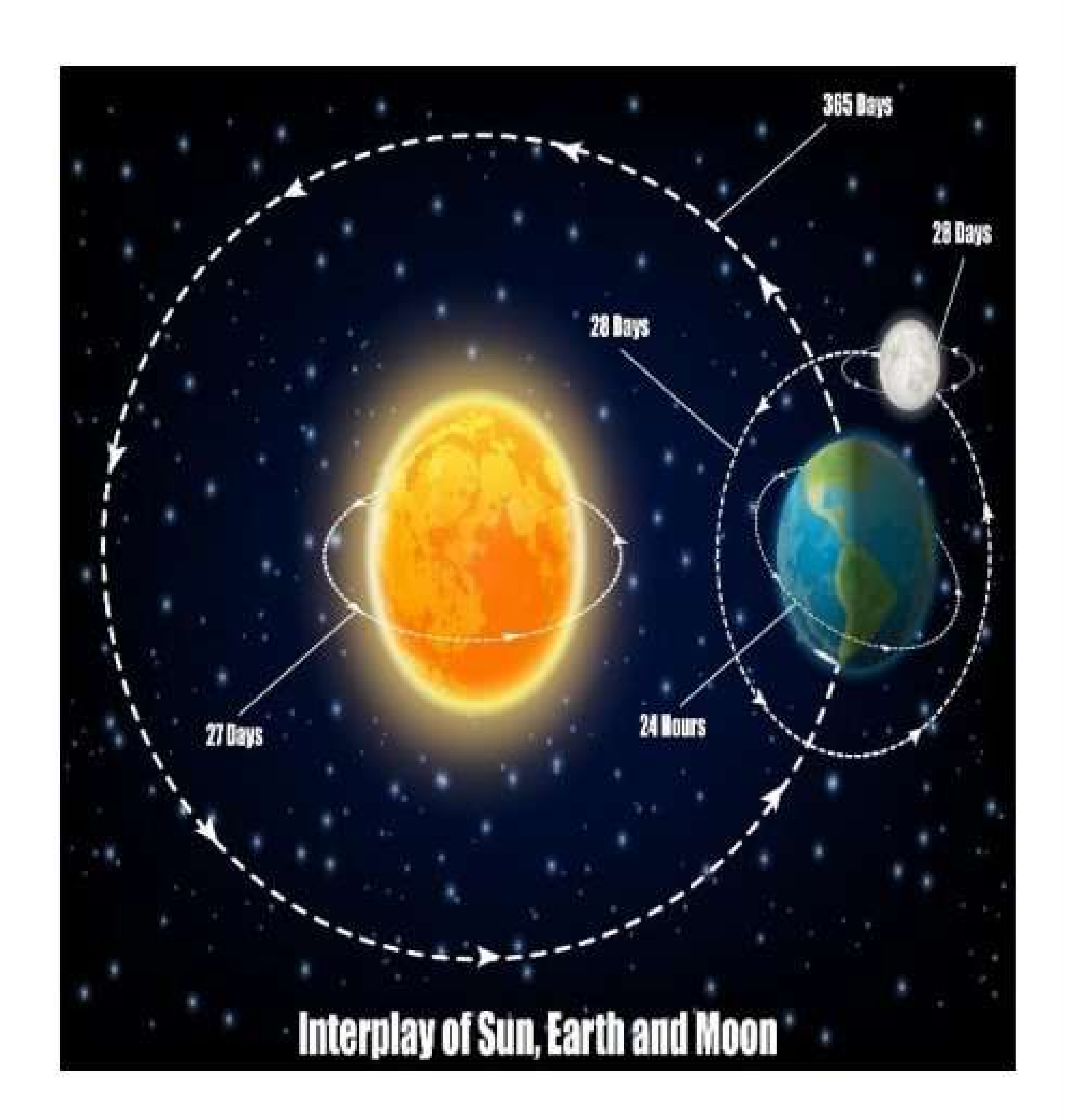
الأجسام ذات الكتلة الأكبر تمارس قوة أكبر على الأشياء من حولها كما هو الحال في نظام الأرض والقمر ، حيث

-Earth is bigger than the moon and it has more mass so, Earth has stronger gravity than the moon.

- الأرض أكبر من القمر ولها كتلة أكبر ، لذا فإن الأرض أقوى من القمر

Also, the gravity of the moon causes the attraction of Earth toward the moon.

.كما أن جاذبية القمر تسبب انجذاب الأرض نحو القمر



The moon stays in a fixed orbit around Earth due to the gravitational force of earth

Check your understanding Put (√) or (x):

1. Gravity does not change the object's direction. (   )

2. All objects that have mass, must have gravity. (   )

Exercises on Lesson (2)

1 -Choose the correct answer :

1. Which force pulls a basketball to fall into the basketball hoop?

a. Magnetism b. Friction c. Gravity d. Motion

2. Magnetism is a kind of ………….force

a. attraction only b. repulsion only c. visible d. invisible

3. A person can exert a weak force to move

a. a big truck. b. a toy car. C. a real car d. a very big rock

4. Wind turbine blades move by the effect of

a. magnetism. b wind. c. electricity. d. water vapor.

5. All the following are properties of magnetism, except

a. it is an invisible force.
b. it happens only between two touched objects.
c. it may be pushing or pulling force.
d it may push another magnet away.

6. Which of the following statements describes gravity in a correct way

a. Gravity pulls objects only.
b. Gravity is found on Earth only.
c. Gravity pushes objects away from each other.
d. Gravity increases between small objects.

7. In contact force, the two objects need to ………each other.

a. attract b. repel c. touch d. break

8. Any object has mass must have…………

a gravity force. b. definite color. c. definite shape. d. electric charge.

2- Choose from column (B) what suits it in column (A):

(A)	(B)
1. Motion	a. is the force between two objects that touch each other
2. Contact force	b. is a pull or push that affects an objects.
3. Non-contact force	c. is the change of an object location due in force.
4. Force	d. is the force between two objects that don't touch each other
	e. is the change of an object mass due to gravity

1. ………….. 2. …………. 3. ………….. 4. …………..

3-Put (√) or (x):

1. Magnet must touch objects to attract them ( )
2. Force is the reason of motion of any body. ( )
3. The change of an object position is called force. ( )
4. Magnet has an invisible force called magnetism ( )

5. The force of magnet is always attraction force only ( )
6. Gravity is similar to magnetism because both of them has only pulling force ( )
7. After leaving a squeezed spring, it has no force to return back to its original state ( )
8. Gravity is attraction or repulsion force between two objects ( )
9. Planets revolve around the Sun in fixed orbits due to the effect of gravity( )
10. Small planets have bigger gravity than big planets ( )
11. Gravity affects only on the moving objects but doesn't affect the objects at rest ( )
12. The moon stay in fixed orbit around Earth due to the gravity between them ( )

4-Write the scientific term of each of the following:

1. The effect that pull or push an object to make it move. (……….……)
2. The change of an object position related to another object (……….……)
3. The force that is found between two magnets or between the magnet and an object (……….……)
4. The pulling force that causes object to fall down toward Earth's surface (……….……).
5. The force of attraction that changes the direction of a moving object in air towards the ground (……….……)

5 -Give reasons for:

1. Paper clips are pulled toward the magnet.

……………………………………………………………………………..

2. The ball changes its direction after we throw it upwards.

……………………………………………………………………………..

3. Gravity of Earth is greater than gravity of the moon.

……………………………………………………………………………..

6- What happens if...?

1. You squeeze a spring then leave it free.

……………………………………………………………………………..

2. There is no gravity on Earth..

……………………………………………………………………………..

Lesson 3

Activity 8 what does down mean ماذا يعنى الهبوط

Activity, *we will investigate the angle at which an object is pulled toward the ground by the force of gravity*

Tools *Several books Meterstick string Small weight Tape Protractor*

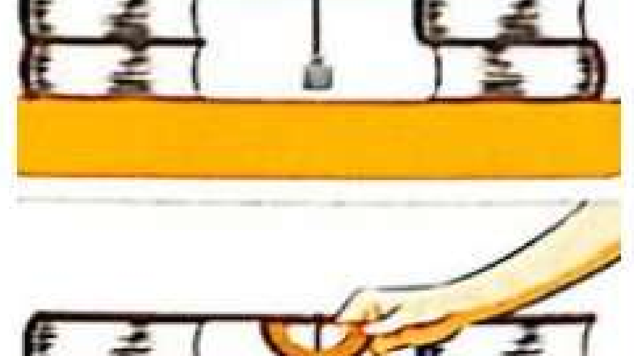
Steps الخطوات

1. Tie the string to the meterstick and use a piece of tape to hold it in place, then attach the weight to the end of the string.



1. اربط الخيط بعصا القياس واستخدم قطعة من الشريط لتثبيته في مكانه ، ثم اربط الوزن بنهاية الخيط.

2. Suspend the meterstick horizontally between the books, so that the string and the weight can move freely.



قم بتعليق المقياس أفقيًا بين الكتب ، بحيث يمكن للخيط والوزن التحرك بحرية

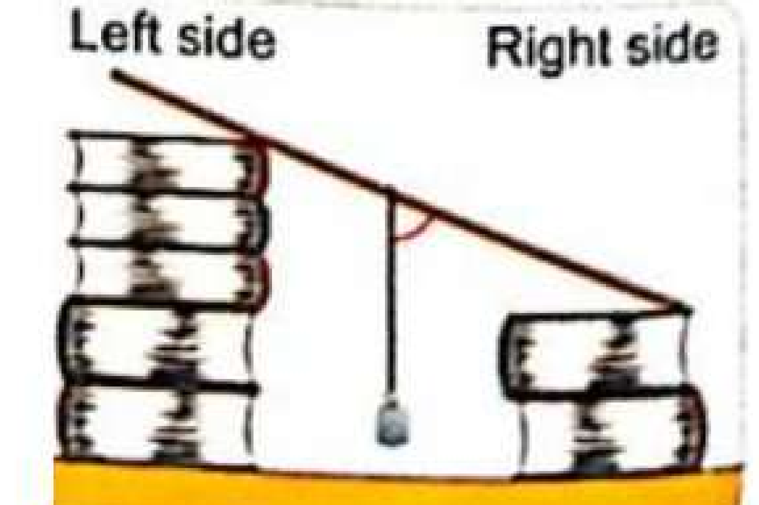
3. Measure the angle between the meterstick and the string using the protractor, قم بقياس الزاوية بين عصا القياس والخيط باستخدام المنقلة

Observation *The angle 90' (because gravity always pulls objects downward)*

ملاحظة ستكون الزاوية 90 '(لأن الجاذبية تسحب الأشياء دائمًا إلى أسفل)

4. Use several more books at the left side to tilt the meterstick up, then measure the angle between the meterstick and the string at the right side using the protractor.

4-استخدم عدة كتب أخرى على الجانب الأيسر لإمالة عصا القياس لأعلى ، ثم قم بقياس الزاوية بين عصا القياس والخيط على الجانب الأيمن باستخدام المنقلة.



Observation *When the meterstick is tilted upward, the angle between the meterstick and the string is less than 90'' (acute angle).*

الملاحظة عندما يميل مقياس القياس لأعلى ، تكون الزاوية بين المسطرة والخيط أقل من 90 بوصة (الزاوية الحادة).

5. Move some books away from the left side to tilt the meterstick down, then measure the angle between the meterstick and the string at the right side using the protractor.

انقل بعض الكتب بعيدًا عن الجانب الأيسر لإمالة عصا القياس لأسفل ، ثم قم بقياس الزاوية بين عصا القياس والخيط في الجانب الأيمن باستخدام المنقلة.

Observation الملاحظة

When the meterstick is tilted downward, the angle between the meterstick and the string is more than 90• (obtuse angle).

عندما يميل مقياس القياس لأسفل ، تكون الزاوية بين المسطرة والخيط أكثر من 90 درجة (زاوية منفرجة).

Conclusions- *All objects on or near Earth's surface are pulled down toward the center of Earth.* الاستنتاجات- يتم سحب جميع الكائنات الموجودة على سطح الأرض أو بالقرب منه باتجاه مركز الأرض

- As the tilt of the meterstick changed, the angle changed because the weight is always being pulled toward the ground.

- مع تغير إمالة عصا القياس ، تغيرت الزاوية لأن الوزن يتم سحبه دائمًا نحو الأرض

Exercises on Lesson (3)

1-Choose the correct answer :

1. ……………force acts on all objects on Earth.

a. Gravity b. Speed c. Electric d. Magnetism

2. Gravity depends on the…………. of a body.

a speed b. mass c. length d. age

3. Which of the following examples shows the effect of gravity clearly?

a. A paper clip moves toward a magnet.
b. A ball slows down while rolling on the ground.
c. A car speeds up on a road. d. A ball falls down toward the ground.

4. A table stands on the ground needs ………..to move.

a. sunlight b. mass c. force d. air

5. All the following sentences are related to gravity, except

a. it is a pulling force. b. it can change the direction of a moving object.
c. it increases the mass of an object d. it arises between Earth and the moon

2-Put (√) or (x):

1. All objects on Earth's surface is affected by magnetism force. ( )
2. Gravity of Earth push objects towards its center. ( )
3. The direction and mass of an object are changed due to gravity. ( )
4. All objects are pulled toward the ground due to the effect of gravity. ( )
5. Any object on Earth's surface is affected by repulsion force of gravity. ( )

3 Complete the following sentences using words below:

(direction – gravity – center - pulling)

1. The direction of Earth's gravity is always toward ……….of Earth.
2. The force of gravity is always….. force, and it changes the……..of movement.
3. Any object has …………depending on its mass.

4. Give a reason for the following You always land on the ground when you jump up

………………………………………………………………………..

5-What happens The gravity of Earth is a repulsion force not an attraction force.

………………………………………………………………………..

6 -Read the following statements, then classify them according to the effect of gravity on them.

1. A pencil rolling on a table. 2. A ball thrown up into the air
3. A car moves along a straight road 4. A paper airplane is thrown through the air.

Gravity will cause a change in direction	Gravity will not cause a change in direction
…………………………………………	…………………………………………
…………………………………………	…………………………………………
…………………………………………	…………………………………………

Lesson 4

Activity 9 Pull and Gravity Around Us السحب والجاذبية من حولنا

Gravity *is a force of objects with more mass that pulls objects with less mass toward them. .* الجاذبية هي قوة الأجسام ذات الكتلة الأكبر والتي تسحب الأشياء ذات الكتلة الأقل تجاهها. .

You cannot see gravity, but you know it is there because you can see its effects لا يمكنك رؤية الجاذبية ، لكنك تعلم أنها موجودة لأنه يمكنك رؤية آثارها

Examples: *-The Sun pulls all planets toward it.* تسحب الشمس جميع الكواكب تجاهها

-Gravity keeps our planet in an orbit around the Sun. الجاذبية تحافظ على كوكبنا في مدار حول الشمس

- Gravity keeps our atmosphere around Earth. الجاذبية تحافظ على غلافنا الجوي حول الأرض

-On Earth, **gravity** *pulls everything (such as humans, rocks, water bodies, animals chairs,... etc.) and holds them to the ground toward the center of Earth.*

- Skydivers and their parachutes are pulled downward toward Earth's surface.

على الأرض ، تسحب الجاذبية كل شيء (مثل البشر ، الصخور ، المسطحات المائية ، كراسي الحيوانات ، ... إلخ) وتثبتها على الأرض باتجاه مركز الأرض يتم سحب القفز بالمظلات ومظلاتهم إلى أسفل نحو سطح الأرض.

Give a reason for: أعط سببًا لـ

Objects like balls drop to the ground after being thrown up into the air.

Due to Earth's gravity that pulls them down toward the ground.

تسقط أشياء مثل الكرات على الأرض بعد رميها في الهواء بسبب جاذبية الأرض التي تسحبهم نحو الأرض .:

Magnetism, friction and air resistance

Magnetism المغناطيسية *Magnetism is a force that attracts metal objects made of iron, nickel or cobalt by pulling on them.*

المغناطيسية هي القوة التي تجذب الأجسام المعدنية المصنوعة من الحديد أو النيكل أو الكوبالت عن طريق سحبها

Example *: Some iron nails can be attracted to a magnet due to its pulling force on them.* مثال.: يمكن أن تنجذب بعض المسامير الحديدية إلى المغناطيس بسبب قوة شدها عليها.

Friction *is a force generated between two touching surfaces*

Friction **slows the movement objects**

الاحتكاك هو قوة تتولد بين سطحين متلامسين. يؤدي الاحتكاك إلى إبطاء حركة الأشياء



Friction *It is a force that opposes the motion of a body across a solid surface or through a gas or liquid*

الاحتكاك هو القوة التي تعارض حركة الجسم عبر سطح صلب أو من خلال غاز أو سائل

Example: *A bicycle brake pulls back the movement of the tires by friction when the bicycle brake rub against the tires*

مثال: تعمل فرامل الدراجة على سحب حركة الإطارات عن طريق الاحتكاك عندما تحتك فرامل الدراجة بالإطارات

Air resistance *as a type of friction force Air resistance* مقاومة الهواء نوع من قوة الاحتكاك مقاومة الهواء

Air resistance *It is a force that opposes the movement of an object as it passes through air* مقاومة الهواء هي القوة التي تعارض حركة الجسم أثناء مروره في الهواء

Skydiver releases parachute to slow his drop, where:

-When the skydiver open his parachute, it gets filled with air due to the upward flow of wind forming air resistance to the parachute.

-The air resistance pulls the skydiver backward and slows his fall to Earth's surface.

Exercises on Lesson (4)

1-Choose the correct answer :

1. Friction force…………. the movement of objects.

a. slows down b. increases c. speeds up d. doesn't affect

2. Magnetism is a force that attracts objects made of the following except

a. iron b. nickel. c. wood d. cobalt.

3. The force that opposes the movement of objects as they pass through air is known as ….

a. magnetism. b. gravity. c. electric. d. air resistance.

4. All the following sentences shows the effect of gravity, except

a. the moon orbits the Earth. b. the planets orbit the Sun.

c. the atmosphere is kept around the Earth.

d. the repulsion between two magnets.

5. …………is considered as a type of friction force.

a. Air resistance b. Magnetism c. Gravity d. Electric force

6. Which the following objects has the least attraction force?

a. The moon. b. The Earth. c. The Sun. d. The magnet.

2-Put (√) or (x):

1. Gravity is not affected by the mass of an object. ( )

2. Gravity of Earth does not change the direction of a body that is thrown up into the air

3. Earth pulls living organisms only toward its center. ( )

4. Force of gravity can be seen easily, but we cannot see its effects. ( )

5. When using the bicycle brake, the bicycle stops due to the friction force between the brake and the tires. ( )

6. Magnetism is a type of friction force ( ).

7. Skydiving sport depends on gravity force and air resistance force. ( )

8. Friction force opposes the movement of an object. ( )

9. Air resistance slows down the speed of parachutes. ( )

10-Magnetism is the force that attracts some metals.

3-Write the scientific term of each of the following:

1. The force that slows down the movement of objects through air.(……………)

2. The force by which metals are attracted or pulled to a magnet. .(……………)

3. A type of friction force that opposes the movement of an object as it passes through air.

4. The tool that is used by skydiver to slow his drop. .(……………)

4- Give reasons for:

1. Skydiver opens his parachute during landing.

2. When you press the bicycle brake, its speed will stop moving after few seconds.

3. Some iron nails are attracted to a magnet.

5-What happens to …?

1. Planets if the gravity of the Sun disappears.

2. The speed of skydiver if he opens his parachute during landing.

3. The gravity pulling force between two bodies when their masses decrease

Lesson 5

Activity 10 Gravity and the Law of Motion الجاذبية وقانون الحركة

In this activity, *we w will investigate the effect of gravity and air resistance on different objects,*

Tools

Two balls with the same size.		Paper clip	Feather
Metal ball (a heavy mass object)	*Plastic ball with holes (a light mass object)*		







Steps

1. Stand on a chair and drop the two balls at the same time from the same height, then observe which ball will reach the floor first.

Observation *The metal ball will reach the floor first.*

2. Stand on a chair and drop the paper clip and the feather at the same time from the same height, then observe which one will reach the floor first.

Observation *The paper clip will reach the floor first.*

Conclusions

1. The plastic ball with holes took longer time to reach the floor, because it was slowed by upward-flowing air more than the metal ball.

2. The feather took longer time to reach the floor, due to its shape as the feather is affected by air resistance more than the paper clip.

-So that, air resistance is a factor that can slow down the falling objects

Law of Motion:

The force of gravity is constant and acts on all objects in the same way.

Imagine that there is no air resistance on Earth:

So, according to the Law of Motion, if we drop a hammer and a paper at the same time from the same height, they will reach the floor at the same moment because gravity acts on all objects in the same way, where the mass or the shape of the objects would not matter.

Exercises on Lesson (5)

1-Choose the correct answer :

1. If you have two balls which are different in mass. Which one of them will reach the ground first if we drop both of them from the same height?

a. The ball with bigger mass. *b. The ball with smaller mass.*
c. The two balls will reach the ground at the same moment.
d. One ball will reach the ground while the other moves upward.

2. What is the effect of air resistance on the speed of an object when it falls downward due to gravity?

a. Air resistance speeds up the object as it falls.
b. Air resistance doesn't affect the speed of an object as it falls.
c. Air resistance slows an object as it falls.
d. Air resistance changes the direction of an object as it falls.

3. When a basketball falls down from a height, it is affected by

a. air resistance force only. *b. gravity force only.*
c. air resistance and gravity force. *d. air resistance and electric force.*

4. If there is no air resistance on Earth and we drop an iron cube and wooden cube at the same time from the same height, they will

a. reach the floor at the same moment. *b. reach the floor at different time.*
c. be affected by magnetic force during falling. *d. move upward against gravity force.*

5.......... is a factor that acts against gravity force.

a. Magnetism *b. Mass of an object* *c. Air resistance* *d. Shape of an object*

6. Which of the following objects will take longer time to reach the ground if they are dropped from 5 meter height at the same time?

a. An iron ball. *b. A feather* *d. A hammer* *c. A plastic ball.*

2-Put (√) or (x):

1. Air resistance is a factor that speeds up the falling abjects toward the Earth. ( )
2. All objects on Earth's surface are affected by gravity force which pulls objects downward. ( )
3. There is no air in space so, air resistance slows down the movement of objects through space. ( )
4. If there is no air resistance on Earth, all objects will reach the Earth's surface at the same moment when dropping them from the same height.
5. Air resistance force acts in the opposite direction of gravity force. ( )
6. Heavier objects reach Earth's surface before smaller objects due to the effect of air resistance which affects their movement. ( )
7. Air resistance is a type of pulling force. ( )

3-Complete the following sentences using the words below:

(Law of Motion-slows down-gravity-air resistance-longer-shorter-constant)

1. The force that pulls objects down toward Earth's surface is called makes its thrown from the same height.

2. When the skydiver opens his parachute the force of speed

3. When throw a plastic ball with holes from

4. The law which states that the force of gravity is objects in the same way is called and acts on all

5 meter height, it will take time to reach the ground while a paper clip takes time when it is

4 Give reasons for:

1. Air resistance affects the movement of an object which falls from a height

……………………………………………………………………………...

2. A pencil takes a longer time to reach Earth's surface than a large rock if they are thrown from the same height.

……………………………………………………………………………...

5-What happens if...?

1. A metal ball and a feather are fallen down from a tower.

……………………………………………………………………………...

2. You throw two iron balls have the same mass from the same height.

……………………………………………………………………………...

3. There is no air resistance and two objects with different masses are thrown from the same height.

……………………………………………………………………………...

Lesson 6

Activity 11 The Revolving Planet الكواكب السيارة

Our solar system *consists of the Sun and a group of planets revolve around it*
يتكون نظامنا الشمسي من الشمس ومجموعة من الكواكب تدور حولها

In 1543, a scientist called **Nicolous Copernicus** *stated that Earth revolves around the sun* في عام 1543 ، صرح عالم يدعى نيكولوس كوبرنيكوس أن الأرض تدور حول الشمس

In the solar system, *each planet revolves around the Sun in a fixed path called an orbit* في النظام الشمسي ، يدور كل كوكب حول الشمس في مسار ثابت يسمى المدار

The orbit of each planet has an ellipse (oval) shape. مدار كل كوكب له شكل (بيضاوي).

Earth revolves around the Sun at a speed nearly equals 107000 km per hour تدور الأرض حول الشمس بسرعة تقارب 107000 كم في الساعة

But, what keeps the planets revolve around the Sun in fixed orbit
ولكن ، ما الذي يجعل الكواكب تدور حول الشمس في مدار ثابت

Gravity *is the invisible attraction or pulling force that holds all the planets in their place* الجاذبية هي قوة الجذب أو الجذب غير المرئية التي تبقي جميع الكواكب في مكانها

The great gravitational pulling force of the sun *keeps the planets revolving in fixed orbits* تحافظ قوة الجاذبية الكبيرة للشمس على دوران الكواكب في مدارات ثابتة

If there were no gravity, the planets would fly off into space.
إذا لم تكن هناك جاذبية ، ستطير الكواكب إلى الفضاء

Give a reason for? إعطاء سبب ل؟

The Sun is the only center of motion in the solar system
الشمس هي مركز الحركة الوحيد في النظام الشمسي

Because the Sun is **much bigger than all the other objects in the solar system,** *so its gravity pulls the other planets toward it.*
لأن الشمس أكبر بكثير من جميع الأجسام الأخرى في النظام الشمسي ، لذا فإن جاذبيتها تجذب الكواكب الأخرى نحوها .

Check your understanding

Complete the following sentences:

1. *The planets revolve around the Sun in ……….paths*
2. *The only center of motion in the solar system is the………….*

Exercises on Lesson (6)

1 -Choose the correct answer :

1. The force of……….. keeps the planets on their paths around the Sun.

a. air resistance b. friction c. gravity d. electricity

2. Gravity is ……………….force that holds all objects in their places.

a. visible pulling b. visible pushing
c. invisible pulling d, invisible orbits.

3. The planets revolve around the Sun in fixed………orbit

a. oval b. irregular c. rectangular d. triangular

4. The speed of Earth's revolution around the Sun is nearly ….. km per hour

a more than 100,000 b. more than 200,000
c. less than 100,000 d. less than 50,000

5-………..is (are) the center of the solar system.

a. The Earth b. The Sun
c. The moon and Earth d. The Sun and Earth

2-Put (√) or (x):

1. The Sun revolves around Earth. ( )
2. The planets revolve around the Sun by the effect of gravitational pushing force. ( )
3. Gravity is an attraction force that can be seen easily. ( )
4. The orbit of each planet has an ellipse shape. ( )
5. The Earth's gravity keeps all planets in their orbits. ( )
6. The scientist Nicolaus Copernicus stated that Earth revolves around the Sun. ( )

3 -Complete the following sentences:

1. The Sun locates at the center of…………….
2. In the solar system, all planets revolve in fixed paths called ....
3. The force that keeps all planets around the Sun is called...............
4. The scientist Nicolaus Copernicus stated that the............... Revolves around the ………….
5. Gravity is the attraction or pulling force that keeps all …………in their orbits around the Sun.
6. The Earth revolves around the Sun in a fixed path that has………. shape

4-Give a reason for the following: Planets revolve around the Sun in fixed orbits

…………………………………………………………………………..

5 -What happens to...? The planets if the Sun has no gravity.

…………………………………………………………………………..

Concept three (4.2)

Patterns of Motion in the sky أنماط الحركة في السماء

Lesson 1

Activity 1 Day and Night الليل والنهار

Look at the opposite picture then put (✓) or (x);

1. Earth is spinning in front of the Sun. ( ) الأرض تدور أمام الشمس

2. Sunlight can reach all areas on Earth's surface at the same time. ( )

Axis
North pole
South pole

Day and night الليل والنهار

Earth spins (rotates) all the time. تدور الأرض (تدور) طوال الوقت

We cannot feel Earth spinning, *but we know that from the regular pattern of day and night.*

لا يمكننا أن نشعر بأن الأرض تدور ، لكننا نعرف ذلك من النمط المعتاد ليلا ونهارا .

• *The phenomenon of regular pattern of day and night happens due to Earth's rotation on its axis.*

• تحدث ظاهرة النمط المنتظم ليلا ونهارا بسبب دوران الأرض حول محورها.

North pole
Axis
South pole

Earth's axis: محور الأرض

It is an **imaginary line passing through the North pole and South pole of Earth.** إنه خط وهمي يمر عبر القطب الشمالي والقطب الجنوبي للأرض.

Earth takes a whole day (24 hours) to make one complete turn on its axis.

During Earth's rotation: أثناء دوران الأرض

Day
Night

-Half of Earth faces the Sun, so this part has day.

نصف الأرض يواجه الشمس ، لذلك هذا الجزء له نهار

-The other half of Earth faces away from the Sun and doesn't receive any light, so this part has night. النصف الآخر من الأرض يواجه بعيدًا عن الشمس ولا يتلقى أي ضوء ، لذلك هذا الجزء ليل

Note :- *The rotation of Earth causes: -* ملحوظة: - دوران الأرض يسبب-

- Regular pattern of day and night. نمط منتظم ليلا ونهارا

-The appearance of the Sun as it is moving across the sky. ظهور الشمس وهي تتحرك في السماء

Check your understanding -Put (√) or (X)

1. Earth takes 12 hours to make complete cycle on its axis. ( )

2. The half of Earth's surface that faces the Sun has day. ( )

3. The Sun appears as it is moving across the sky due to the rotation of Earth. ( )

Activity 1 Patterns of Motion in the Sky أنماط الحركة في السماء

When Earth rotates on its axis, it causes the Sun, moon and stars seem to rise in the east and travel across the sky, then set in the west.

عندما تدور الأرض حول محورها ، يبدو أن الشمس والقمر والنجوم تبدو وكأنها تشرق في الشرق وتنتقل عبر السماء ، ثم تغيب في الغرب

Where is the Sun in the sky ? أين الشمس في السماء؟

The Sun appears to change its direction in the sky during the day. When you are facing the north direction of Earth and stretch your arms, you will see that:

يبدو أن الشمس تغير اتجاهها في السماء أثناء النهار .عندما تواجه الاتجاه الشمالي للأرض وتمدد ذراعيك ، سترى ما يلي

In early morning

في الصباح الباكر

The Sun would be to your right (east), rising in the sky.

ستكون الشمس على يمينك (شرقًا) ، تشرق في السماء

At noon

في الظهيرة

The Sun would be above you in the center of the sky.

ستكون الشمس فوقك في وسط السماء

In late afternoon

بعد الظهر

The Sun would be to your left (west), setting in the sky.

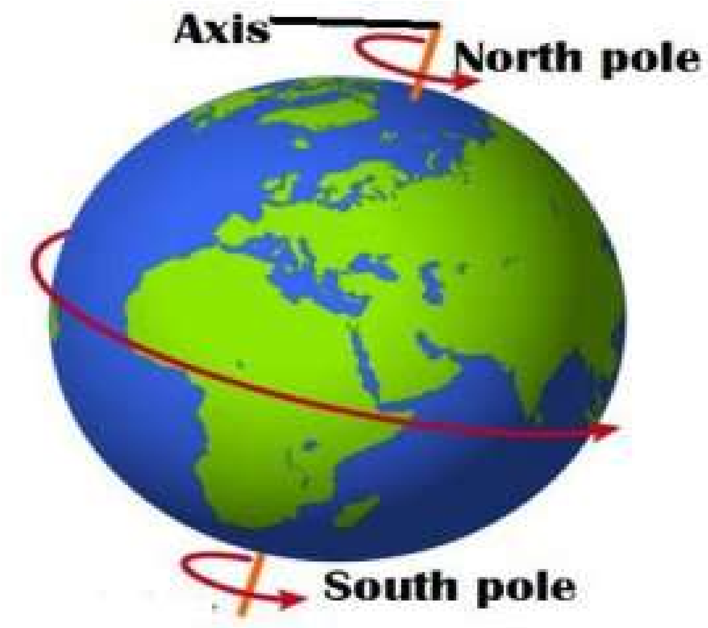
ستكون الشمس على يسارك (غربًا) ، وتغيب في السماء :في وقت متأخر.

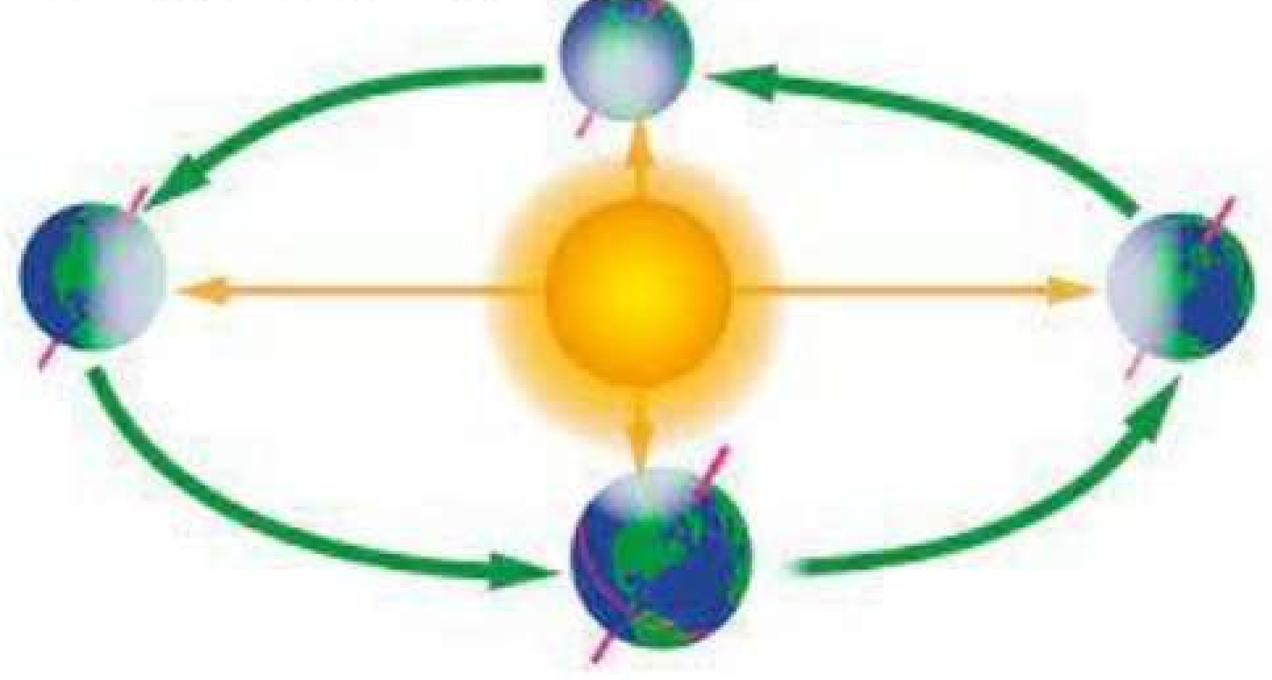
Note *If you change your direction, facing north or south, the Sun will always rise in the east and set in the west.*

ملاحظة إذا غيرت اتجاهك ، وواجهت الشمال أو الجنوب ، فستشرق الشمس دائمًا في الشرق وتغرب في الغرب.

Rotation or revolution

Rotation دوران	**Revolution**
It is the spinning of an object around an axis إنه دوران جسم حول محور	*It is the orbiting of an object are another object* جسم يدور حول جسم آخر
Example: مثال	**Example:** مثال
Earth rotates on its axis. تدور الأرض حول محورها	*Earth revolves around the Sun orbit* تدور الأرض حول مدار الشمس





Check your understanding **Complete the following sentences using the words below** *(Revolution –rotates –day -night).*

1. Earth ……….on its axis every 24 hours

2. The surface of Earth that faces the Sun has ………. and the surface of Earth that faces away from the Sun has

3. The orbiting of Earth around the Sun is called…………

Exercises on Lesson (1)

1 -Choose the correct answer :

1-Day and night phenomenon occurs due to the rotation of Earth around…………..

a. The sun b. its axis. C. the moon. d. the solar system.

2-The Earth rotates around itself once every………..

a.24 hours b.365 days c. 365 hours d.24 days

3. The Earth's axis is an imaginary line that passes through…………

a. the two poles of Earth b. the center of the moon.
c. the center of the solar system d. the center of the Sun.

4-The Sun appears as it moves from…………..to ……….

a. south-north b. east-west. c. west-east d. north-south.

5. The Sun appears in the ………….. during the early morning

a. east b. west c. north d. south

6- in the middle of the day (at noon) we can see the Sun in …… of the sky.

a. the left side b. the right side c. above in the center d.the west direction

7. If you travel from your country to another, the Sun will ……….

a. rise in the west and set in the east. b. rise in the south and set in the north
c. rise in the east and set in the west. d. rise in the north and set in the south

8. When half of Earth faces the Sun so, it has…. and the other half has…..

a. day-day b. night-day c. day- night d. night-night.

9-Which of the following sentences describes the Earth's axis correctly ?

a. It is a real line that passes through the Earth's two poles.
b. It is an imaginary line that divides the Earth into two unequal parts.
c. It is an imaginary line that passes through the Earth's two poles
d. It is a real line that divides the Earth into two unequal parts.

10-The Sun appears as it moves in the sky due to the……….

a. revolution of the Sun around Earth b. revolution of Earth around the Sun,
c. revolution of the moon around Earth. d. rotation of Earth on its axis.

2 Write the scientific term of each of the following

1. The phenomenon that occurs due to the rotation of Earth on its axis(……..)
2. An imaginary line that passes through the two poles of Earth. (………..)
3. The spinning of Earth on its axis. (………..)
4. The orbiting of Earth around the Sun. (………..)
5. The phenomenon that occurs when half of the Earth is facing the Sun (……...)
6. The phenomenon that occurs when half of the Earth doesn't receive the sunlight. (………..)

2-Put (√) or (x):

1. The Earth revolves around the Sun once every 24 hours. ( )
2. The Earth's axis is a real line passes through Earth's poles. ( )
3. At the beginning of the day, the Sun appears in the west direction. ( )

4. *If you change your direction on Earth's surface, the Sun will rise from west ( )*
5. *The spinning of Earth on its axis is called revolution. ( )*
6. *Most of stars don't appear moving in the sky. ( )*
7. *The movement of shadows is due to the movement of Earth around the Sun ( )*
8. *All parts of Earth receive sunlight at the same time. ( )*
9. *The regular pattern of day and night occurs due to the rotation of Earth around the Sun. ( )*
10. *The Sun rises in the east and sets in the west. ( )*
11. *In the early morning, the Sun would be above you in the center of the sky( )*
12. *The Sun appears in the same place in the sky all the day. ( )*

4- Give reasons for:

1. Occurrence of day and night.

……………………………………………………………………………..

2. Half of Earth appears dark at night.

……………………………………………………………………………..

3. The Sun appears as it moves across the sky.

……………………………………………………………………………..

5- what happen if

1-Earth doesn't rotate on its

……………………………………………………………………………..

2-Half of Earth faces the Sun

……………………………………………………………………………..

3-Earth completes its spinning on its axis in 12 hours only

……………………………………………………………………………..

6-Look at the opposite figure then choose the correct answer

Side (A) C Side (A)

1. Side (A) is at (day time- night time)
2 Side (B) is at (day time- night time)
3 Point (C) is called (Earth's axis- Earth's center)
4. The regular pattern of day and night is due to of Earth on its axis (rotation-revolution)
5-Due to the rotation of Earth around itself, the Sun appears moving from…… (north to south- east to west)
6-Earth rotates around itself once every (one day- one year)

Lesson 2

Activity 4 rotation الدوران

Cycle of day and night دورة - النهار والليل

Cycle *means a series of events that is repeated in the same order for example* دورة - النهار والليل تعني الدورة سلسلة من الأحداث التي تتكرر بنفس الترتيب على سبيل المثال

-The cycle of day and night دورة النهار والليل

-The cycle of seasons. دورة الفصول

Earth rotates counterclockwise on its vertical axis that passes through the two poles of Earth causing the cycle of day and night

تدور الأرض عكس اتجاه عقارب الساعة على محورها الرأسي الذي يمر عبر قطبي الأرض مسبباً دورة النهار والليل .

Earths revolution around the sun causes the cycle of seasons

دورة الأرض حول الشمس في دورة الفصول

Solar system المجموعة الشمسية

Solar system includes the Sun and the eight planets that revolve around the Sun in fixed orbits المجموعة الشمسية يشمل الشمس والكواكب الثمانية التي تدور حول الشمس في مدارات ثابتة



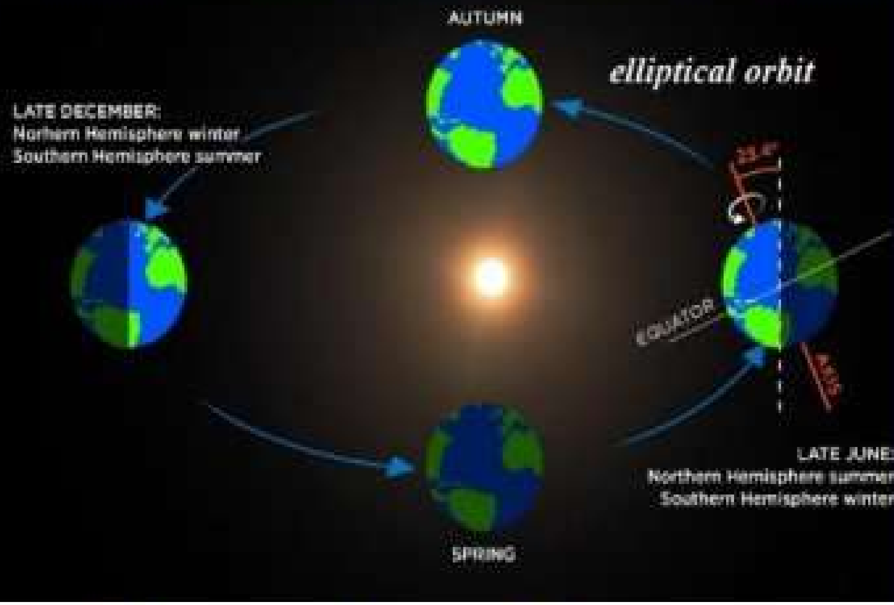
Planets rotate on their axes at different speeds

تدور الكواكب حول محاورها بسرعات مختلفة

Jupiter *is the fastest planet that rotates on its axis in the solar system (Jupiter is of the eight planets of solar system)*

المشتري هو أسرع كوكب يدور حول محوره في المجموعة الشمسية (كوكب المشتري هو أحد الكواكب الثمانية في المجموعة الشمسية)

Activity 5 Sunrise شروق الشمس



Sunrise and Sunset شروق الشمس وغروبها

Earth revolves around the Sun in an elliptical orbit (oval path). Earth is slightly tilted on its axis.

تدور الأرض حول الشمس في مدار الإهليلجي الشكل (مسار بيضاوي) تميل الأرض قليلاً حول محورها

As Earth revolves around the Sun, the angle of changes throughout the year.. عندما تدور الأرض حول الشمس ، تتغير زاوية دورانها على مدار العام

The Sun appears to travel across the sky at slightly different speeds each day due to أن الشمس تسافر عبر السماء بسرعات مختلفة قليلاً كل يوم بسبب

-The elliptical orbit of Earth. The tilt of Earth on its axis. ميل الأرض على محورها

So, the two reasons above cause different sunrise and sunset times each day on Earth لذلك ، فإن السببين المذكورين أعلاه يتسببان في اختلاف أوقات شروق وغروب الشمس كل يوم على الأرض

The sunrise and sunset in some cities in Egypt شروق وغروب الشمس في بعض مدن مصر.

The Sun rises from east and sets from west تشرق الشمس من الشرق وتغرب من الغرب

The cities in east see the sunrise before the cities in west

المدن في الشرق ترى شروق الشمس قبل المدن في الغرب ..-

For example:

The following two tables show the sunrise, sunset and the length of day from Nov. 30 to Dec. 2 in two different cities in Egypt which are

Marsa Alam *(a city in the far east of Egypt)*

Siwa *(a city in the far west of Egypt)*

In Marsa Alam

Day	Sunrise	Sunset	Length of day
Nov. 30	6:07 am	4:50 pm	10:42
Dec. 1	6:08 am	4:50 pm	10:41
Dec. 2	6:09 am	4:50 pm	10:41

In Siwa

Day	Sunrise	Sunset	Length of day
Nov. 30	6:53 am	5:19 pm	10:25
Dec. 1	6:54 am	5:19 pm	10:24
Dec. 2	6:55 am	5:19 pm	10:24

From the previous tables we can conclude the following informations:

Marsa Alam *sees the sunrise 46 minutes before* **Siwa**.

The length of day decreases in Marsa Alam and Siwa from Nov. 30 to Dec. 2

The length of day in Marsa Alam *is always longer than it in Siwa.*

International Space Stationمحطة الفضاء الدولية

It is a spacecraft in the orbit of Earth. orbit Earth at high speed where it takes to make one turn around Earth,

إنها مركبة فضائية في مدار الأرض يدور حول الأرض بسرعة عالية حيث يتطلب الأمر دورانًا واحدًا حول الأرض،

So astronauts of international Space Station many see many sunrises in one day (they can see early 16 sunrises every 24 hours).

لذلك يرى العديد من رواد الفضاء في محطة الفضاء الدولية العديد من شروق الشمس في يوم واحد (يمكنهم رؤية شروق الشمس المبكر 16 مرة كل 24 ساعة).

Check your understanding

-Put (√) or (x):

1-The tilt angle of Earth doesn't change throughout the year. ( )

2-The Sunrise and sunset occur at the same time every day. ( )

► Complete the following sentences using the words below :

(8 planets - east-west - the Sun)

1. The solar system includes................ that revolves around.................

2. The cities in ....the see the sunrise after the cities in the..................

Exercises on Lesson (2)

1 -Choose the correct answer :

1. The Earth's axis is

a. vertical. b. horizontal. c. circular d. real

2. Orbiting of Earth around the Sun causes the

a. cycle of day and night. b. cycle of seasons.
c. increasing the speed of Earth. d. decreasing the speed of Earth

3. The number of stars in the solar system is.........

a. one . b. eight c. nine. d. two.

4. The Earth rotates.......... on its axis.

a clock wise b. counterclockwise
c. from north to south d. from south to north

5. The solar system consists of some....... and one...........

a. Sun-planets. b. moons-planets c. planets-Sun. d. planets-moon.

6. Jupiter is a ....and it has........... on its axis.

a. moon-highest speed b. planet - lowest speed
c. star-lowest speed d. planet-highest speed

7. All the following sentences describe the solar system, except

a. it contains the Sun and the eight planets.
b. its planets revolve around the Sun in fixed orbits.
c. its planets rotates on their axes at the same speed.
d. it contains Earth, Jupiter and the Sun only.

8. The fastest planet that rotates on its axis in the solar system is

a. the Sun. b. Earth. c. Jupiter. d. the moon.

9. In different cities, the Sun sets in different times due to ....

a. the circular path of Earth around the Sun only.
b. the tilt of Earth on its axis only.
c. the elliptical orbit of Earth around the Sun only.
d. the elliptical orbit of Earth and the tilt of Earth on its axis.

10. In Egypt the cities in see the sunrise before the cities in..........

a. east-west. b. west-east. c. north-south. d. south-north.

11. The spacecraft that orbits Earth takes about to ....make one turn around Earth

a more than 3 hours
b. more than one hour
c less than 2 hours and more than one hour
d. less than one hour and more than half an hour

2- Choose from column (B) what suits it in column (A):

(B)	(B)
1. Jupiter	a. is a spacecraft that orbit the Earth
2. International Space Station	b. is the center of the solar system.
3. Earth	c. is the fastest planet that rotates on its axis
4. The Sun	d. is the planet that completes one cycle on its axis in 24 hours.
	e. is the path in which planets revolve around the Sun.

1………..2. …………3. ………….4. ………….

3-Put (√) or (x):

1. All planets of the solar system rotate around the Sun in one orbit only. ( )
2. Earth revolves around the Sun once every one day. ( )
3. The Earth's axis is a vertical axis that passes through the Earth's two poles( )
4. Earth's revolution around the Sun causes day and night phenomenon. ( )
5. The repeatition of series of events in the same order is called cycle. ( )
6. Earth rotates on its axis in clockwise direction. ( )
7. The solar system includes the Sun and Earth only. ( )
8. Earth revolves around the Sun in a fixed path. ( )
9. Earth's rotation on its axis causes the cycle of day and night. ( )
10. The Sun doesn't revolve around Earth. ( )
11. The Sun sets at the same time in all cities of Egypt. ( )
12. Planets of the solar system rotate on their axes with different speeds. ( )
13. An astronaut on the International Space Station can observe many sunrises every day. ( )
14. The length of day and night are always equal during the whole year. ( )

4-Correct the underlined word:

1. The center of the solar system is the <u>Earth</u>. (…………….)
2. The phenomenon of <u>four seasons</u> occurs due to rotation of Earth on its axis. (…………….)
3. The Earth orbits the Sun in a <u>rectangular</u> path. (…………….)
4. The Earth spins around its axis once every 28 hours. (…………….)

5- Write the scientific term of each of the following:

1. The fastest planet during its rotation on its axis. (…………….)
2. The time taken by Earth to complete one rotation on its axis. (………….)
3. A phenomenon occurs due to Earth's revolution around the Sun.(…..…….)
4. The Sun and eight planets revolving around it. (…………….)
5. The series of events that is repeated in the same order. (…………….)

6-Complete the following sentences

1. Solar system includes ……….at its center and eight…………around it
2. Cycle of ……………happens due to Earth's rotation on its…………….
3. Earth revolves around …………..and the angle of ……………changes throughout the year.
4. The astronauts of …………..station can see many………… in one day
5. A series of events that is repeated in the same order is called…………

7 -Give reasons for:

1. Occurrence of seasons.

…………………………………………………………………………………..

2. Occurrence of different sunrise and sunset times each day on Earth.

…………………………………………………………………………………..

3. Astronauts of International Space Station can see many sunrises in one day

…………………………………………………………………………………..

8- What happens if...?

1. Earth stops spinning on its axis.

…………………………………………………………………………………..

2. Earth's axis is not tilted.

…………………………………………………………………………………..

3-Both Earth and Jupiter make one cycle on their axis with the same speed

…………………………………………………………………………………..

Lesson 3

Activity 6 Effects of Earth's Rotation تأثير دوان الارض

Earth rotates on its axis at high speed that reaches more than 1600 km/h
تدور الأرض حول محورها بسرعة عالية تصل إلى أكثر من 1600 كم / ساعة

We cannot only feel the high speed of Earth's rotation, but also it seems like Earth is standing still because we are moving with Earth,
.لا يمكننا أن نشعر فقط بالسرعة العالية لدوران الأرض ، ولكن يبدو أيضًا أن الأرض ثابتة لأننا نتحرك مع الأرض ،

where everything attached to the surface of Earth moves at the same speed of Earth. حيث يتحرك كل شيء متصل بسطح الأرض بنفس سرعة الأرض

For example:



If you are sitting in a moving car looking out the window at nearby car moving in the same direction with the same speed, you will not feel that you are moving, but in fact you are traveling at many kilometers per hour.
إذا كنت تجلس في سيارة متحركة وتنظر من النافذة إلى سيارة قريبة تتحرك في نفس الاتجاه وبنفس السرعة، فلن تشعر أنك تتحرك، ولكن في الحقيقة أنت تسافر بسرعة عدة كيلومترات في الساعة.

Movement of objects in the sky حركة الأجسام في السماء

Earth's rotation on its axis causes celestial bodies such as (the Sun and stars) appear to move in the sky such as:
يتسبب دوران الأرض حول محورها في ظهور الأجرام السماوية مثل (الشمس والنجوم) وكأنها تتحرك في السماء مثل

The Sun appears to rise in the east and set in the west.
يبدو أن الشمس تشرق من الشرق وتغرب في الغرب

-Stars seem to move in the sky at night, where some stars seem to rise and set like the Sun. تبدو النجوم وكأنها تتحرك في السماء ليلاً ، حيث تبدو بعض النجوم وكأنها تشرق وتغيب مثل الشمس

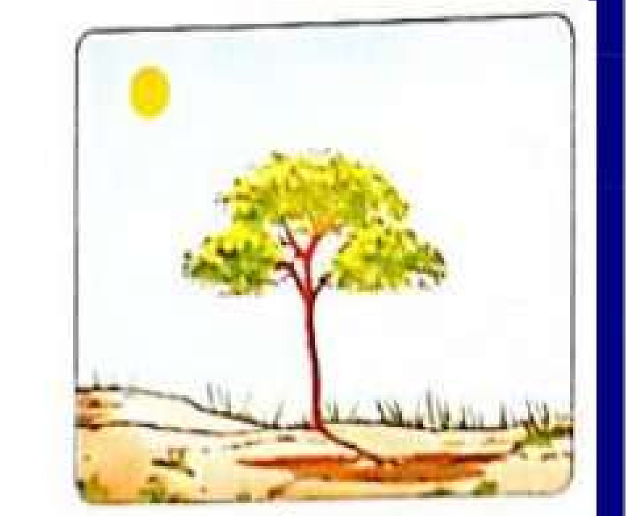
Give a reason for: Although Earth rotates on its axis, we don't feel its movement.
على الرغم من أن الأرض تدور حول محورها ، فإننا لا نشعر بحركتها

Because we are moving with the same speed of Earth. لأننا نتحرك بنفس سرعة الأرض

Notes *1.* **The Sun cause***s the formation of* **shadows** *of objects on Earth.*
تتسبب الشمس في تكوين ظلال الأجسام على الأرض

2. As the **Sun appears to move in the sky***, this causes the movement of shadows of e which proves that Earth rotates on its axis.*
عندما يبدو أن الشمس .يثبت أن الأرض تدور حول محورها .2
مما تتحرك في السماء ، فإن هذا يتسبب في حركة ظلال

For example: The shadow of a tree


In morning In afternoon

Check your understanding-Put (√) or (x):

1. Earth's revolution causes the Sun and stars seem to move in the sky. ( )

2. The shadow moves throughout the day on Earth due to the Sun appears to move across the sky.( )

Activity 7 What Can Shadow Tell Us?

The Sun appears to move throughout the day, so does the shadow it casts Early, the ancient Egyptians used shadows cast by giant stone to know the time of the day. Later the ancient Egyptians invented the first timepiece that used to know the me called sundial (shadow clock).

Activity, *we will make a sundial that used to collect data about shadows*

Tools

Rectangle-shape carton - Plastic straw Colored pencils Ruler Protractor





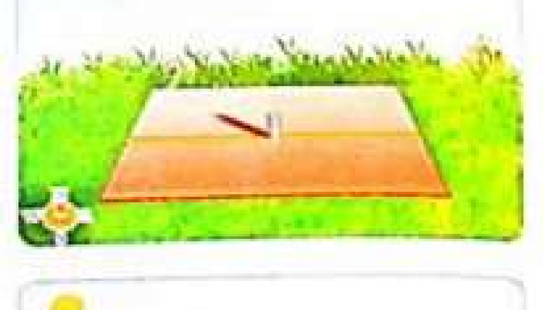
1-Draw two lines that split the piece of carton vertically and horizontally, where the Intersection of these lines is the center of the Carton piece.

.أرسم خطين يقسمان قطعة الكرتون رأسياً وأفقياً ، حيث يكون تقاطع هذين الخطين هو مركز قطعة الكرتون



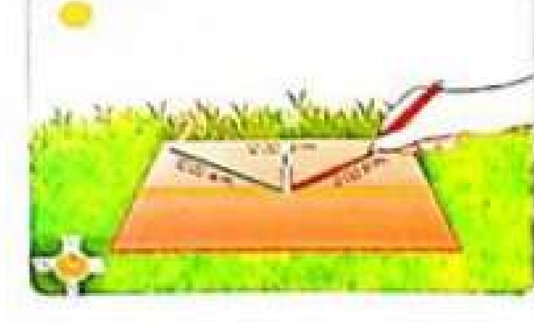
2-Make a small hole at the center of carton piece and fix the plastic straw in it, then erase me vertical line.

.عمل فتحة صغيرة في وسط قطعة الكرتون وتثبيت الشفاط البلاستيكي بها ثم امسحي خط عمودي



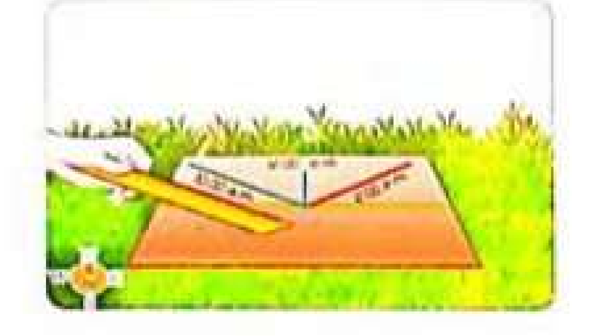
3. Put the sundial in an open area facing the north direction and keep it in the same place without moving it during the activity

ضع الساعة الشمسية في منطقة مفتوحة تواجه اتجاه الشمال واحتفظ بها في نفس المكان دون تحريكها أثناء النشاط



4. Trace the shadow of the straw using three different colored pencils at different three hours which are: (10:00 a.m.), (12:00 p.m.) and (02:00 p.m.).

4. تتبع ظل القش باستخدام ثلاثة أقلام ملونة مختلفة في ثلاث ساعات مختلفة وهي: (10:00 صباحًا) و (12:00 مساءً) و (02:00 مساءً).



5. Remove the straw.

For each shadow line, detect the following measurements:

-The length of each shadow line using the ruler.

-The angle between the shadow line and the horizontal line using the Protractor.



Observation *From the previous table we can observe that the lengths of the shadows and their angles changed throughout the day.*

► **Conclusion** *Throughout the day, the change in the position of the Sun in the sky due the Earth's rotation affects the lengths and angles of shadows of objects on Earth.*

Exercises on Lesson (3)

1-Choose the correct answer :

1. The rotation of Earth.........at ....causes day and night phenomenon

a. around the Sun-high speed *b. on its axis-high speed*

c. around the moon - low speed *d. on its axis-low speed*

2. All objects that are attached to the surface of Earth are moving........

a. with the same speed of Earth *b. with higher speed than that of Earth*

c. with lower speed than that of Earth. *d. against the motion of Earth.*

3. Rotation of Earth on its axis causes all the following phenomena, except

a movement of the Sun from east to west.

b. movement of stars in the sky at night.

c. some stars seem to rise and set like the Sun.

d. occurrence of four seasons.

4. Formation of shadows of objects happens due to

a. revolution of Earth around the Sun.

b. revolution of Earth around the moon.

c. appearance of stars as they move in the sky.

d. appearance of the Sun as it moves in the sky.

5. Ancient Egyptians invented......... which depends on the movement of...............to know the time of the day.

a. the balance-time *b. the sundial-time*

c. the telescope – distance *d. the sundial-shadow*

6. Lengths and angles of shadows of objects are affected by

a. the change in the position of the Sun in the sky.

b. the distance between Earth and the Sun.

c. the revolution of Earth around the Sun.

d. the revolution of the moon around Earth.

7. The shortest shadow of an object happens...........

a. in morning. *b. in afternoon.* *c. at noon.* *d. at night.*

8. The amount of sunlight that reaches the Earth's surface during the day...

a. doesn't change during different seasons.

b. changes during different seasons.

c. increases at night. *d. decreases at noon.*

2-Put (√) or (x):

1. Earth rotates on its axis at low speed ( )

2. We can feel the movement of Earth easily. ( )

3. All objects on Earth's surface move with the same speed of Earth. ( )

4. Movement of objects in the sky is due to the Earth revolution around the Sun ( )

5. The position of the shadow of Cairo Tower will not change during the day. ( )
6. All people in different countries see the stars in the sky at the same time ( )
7. The Sun appears to move throughout the day. ( ) ( )
8. Ancient Egyptians were able to know the time by inventing the first sundial.
9. Lengths of shadows of different objects don't change during the day. ( )

3 Complete the following sentences:

1. Earth's rotation on ………..causes the Sun seems to rise in……. direction and sets in ………….direction.
2. Formation of……….of objects is due to movement of…… across the sky
3. The first time piece that is used by ancient Egyptians to know the time is called ……………….
4. The position of the Sun in the sky affects……..and …… of shadow of objects
5. In morning and……….the Sun forms longer shadow of an object.
6. At noon the Sun forms…………. shadow of an object.

4 -Give reasons for:

1. Although Earth rotates on its axis, we don't feel its movement.

……………………………………………………………………………

2. The length of the shadow of an object changes throughout the day.

……………………………………………………………………………

3. In the night sky, some stars seem to rise and set like the Sun.

……………………………………………………………………………

5 What happen to ...?

1. The length of the shadow of an object at noon.

……………………………………………………………………………

2. The shadow of an object if the Sun locates at east or west in the sky.

……………………………………………………………………………

Lesson 4

Activity 8 Constellations Visible during Different Seasons

الابراج الفلكية مرئية خلال المواسم المختلفة

Constellation التجمع النجمى (الابراج الفلكية)

It is a group of stars that forms a pattern or looks like a certain shape in the sky.

هو مجموعة من النجوم تشكل نمط او شكل محدد فى الفضاء

Stars that form a constellation are not connected to each other

النجوم فى الابراج غير متصله ببعضها

but, if these stars are connected by imaginary lines, they will look like an object, animal or person.

ولاكن عند توصيلها بخط تخيلى تظهر فى شكل جسم حيوان او شخص

Orion

Example:

The Constellation Orion *that ancient Greeks gave it this name relative to a mythical hunter.*

صيّاد أسطوري برج الجوزاء أعطتْه اللغة اليُونانيَّة القَدِيمَةِ هذا الاسمِ نسبة إلى صياد أسطوري

Movement of constellations. حركة الابراج

The positions of stars don't change, but they seem to move across the night sky *due to Earth's rotation on its axis.*

مواقع النجومِ لا تَتغيَرُ، لَكنَّهم يَبْدونَ متحركين عبر السماءِ ليلا بسبب دورانِ الأرضِ حول محورِها

- **Constellations appear at different locations in the sky during different times of the year** *Due to Earth's revolution around the Sun.*

تَظْهرُ الأبراجُ في مواقع مختلفةِ في السماءِ وفى أوقاتِ مختلفةِ مِنْ السَنَةِ بسبب دورانِ الأرضِ حول الشمس

- *We can see different constellations in* **winter** *than in* **summer**.

يُمْكِنُ أَنْ نَرى أبراجَ مختلفةَ في الشتاءِ مِنْ الصيفِ .

- **Other constellations that we can't see them in the sky**, *still exist in the sky as they are not visible from on Earth.*

الأبراج الأخرى التي لا نَستطيعُ رُؤيتهم في السماءِ، ما زالَتْ موجودة في السماءِ ولكنهم غيرمرئيينَ مِنْ على الأرضِ

Every night, *new stars* **appear from the east** *because the part of the night sky we see changes a little bit every night, then after one revolution around the Sun, we will see the same part of the night sky again and so on.*

كُلَّ لَيلة، تَظْهرُ نجومَ جديدةَ مِنْ الشرقِ لأن ليلا جزءَ من السماءِ يتغير قليلا كُلَّ لَيلة ، ثمّ بعد دورة واحدة حول الشمسِ، نرى نفس جزءِ من السماءِ ليلا ثانيةً وهكذا

Activity 9 Star-light ضوء النجوم

Stars make their own light from hot gases that make them bright.
النجوم تصنع ضوئها الخاص بها من غازات ساخنة مما يجعلها لامعة

Some stars are larger than the Sun while others are smaller than it.
بَعْض النجومِ أكبر مِنْ الشمسِ بينما بعض الآخر أصغر منها.

Planets and moons *don't make their own light.*
الكواكب والأقمار لا تصنع ضوءَها الخاصَ.

GR: We see the moon shining in the sky.

Bec. it reflects light from the Sun.

Constellations الأبراج

Some constellations are always visible in the sky while other can be seen only during specific seasons.
بَعْض الأبراجِ مرئية دائماً في السماءِ بينما أبراج أخرى يُمْكِنُ أَنْ تُرى فقط أثناء فصولِ معيّنةِ.

Stars closer to the north and south poles move slightly in the sky, so the place of these stars (constellations) changes a little bit in the night sky throughout the year
النجوم ألاقرب إلى الأقطابِ الشماليةِ والجنوبيةِ تَتحرّكُ قليلا في السماءِ، لذا مكان هذه النجوم يتغيّرُ قليلاً في السماءِ ليلا على مدار السَنَة

Note

Importance of Location of constellations in the sky during the year,

help us to determine the main directions (north, south, east and west).
موقع الأبراجِ في السماءِ أثناء العام ، يُساعدُنا لتحديد الإتّجاهاتِ الرئيسيةِ (شمال، جنوب، شرق وغرب)

Test your self

1 -Choose the correct answer :

1. The group of stars that make a certain shape in the sky is called ....

a solar system. *b. universe.* *c. constellation.* *d. ecosystem*

2-Every night, we can see new stars appear from ....direction.

a. north *b. south* *c. east* *d. west*

2-Put (✓) or (X):

1. The stars we see in each constellation are very close to us. ( )

2. The Sun is the biggest star in the universe. ( )

3-Complete the following sentences:

1. A constellation consists of a group of .... that form a pattern

2. Stars seem to move across the night sky due to the............. of Earth on its axis.

4-Give reasons for:

1. Stars seem to move in the sky. .

....

5- What happens if... ? Stars are not made up of hot gases .

....

Exercises on Lesson (4)

1 -Choose the correct answer :

1. The group of stars that make a certain shape in the sky is called

a solar system. b universe. c. constellation: d. ecosystem

2. Constellation appear ....in the sky during the year.

a. at different positions b. at the same position

c. in winter only d. in summer only

3. All the following are from the properties of constellations, except ......

a. they consist of stars and planets.

b. they change their positions throughout the

c. they seem to move across the night sky.

d. they can form certain shapes in the sky.

4. Every night, we can see new stars appear from....... direction

a. north b. south c. east d. west

5- ....are celestial bodies that make their own light.

a. Moons and planets b. The Sun and stars

c. The Sun and planets d. Earth and the Sun

6. Knowing the constellation's position in the sky during the year, helps us to know

a. the time. b. the main directions.

c. the amount of light that reaches Earth.

d. the location of the moon away from Earth.

7. The Sun and other stars are made up of............

a. hot solids. b. cold solids. c. hot gases. d. cold liquid

2-Put (√) or (X):

1. All celestial bodies make their own light. (...)

2. Constellations have similar shapes in the sky. (...)

3. Constellation Orion is called by this name by ancient Greeks relative a mythical hunter. (...)

4. Stars seem to move in the sky due to Earth's revolution around the sun (...)

5. All constellations can be seen in the sky every day along the year.

6 Earth can make its own light (...)

7. Sunlight falls on the moon's surface so, it seems bright at night. (...)

8. The Sun is a medium sized star (...)

9. Stars are made up of hot liquids. (...)

10. The stars we see in each constellation are very close to us. (...)

11. The Sun is the biggest star in the universe. (...)

3 Complete the following sentences:

1. A constellation consists of a group of ....that form a pattern.

2. Ancient Greeks gave constellation............. its name relative to a mythical

3. Stars seem to move across the night sky due to the………. of Earth on its axis
4. Planets and………… can't make their own light.
5. Stars seem bright because they are made up of …………
6. Location of ………..in the sky during the year, helps up to determine of Earth.

4-Give reasons for:

1. Stars seem to move in the sky.

…………………………………………………………………………………………

2. The moon appears bright in the sky at night.

…………………………………………………………………………………………

3-If we are travelling in desert, stars may help us to determine our co across the desert.

…………………………………………………………………………………………

5- What happens if…?

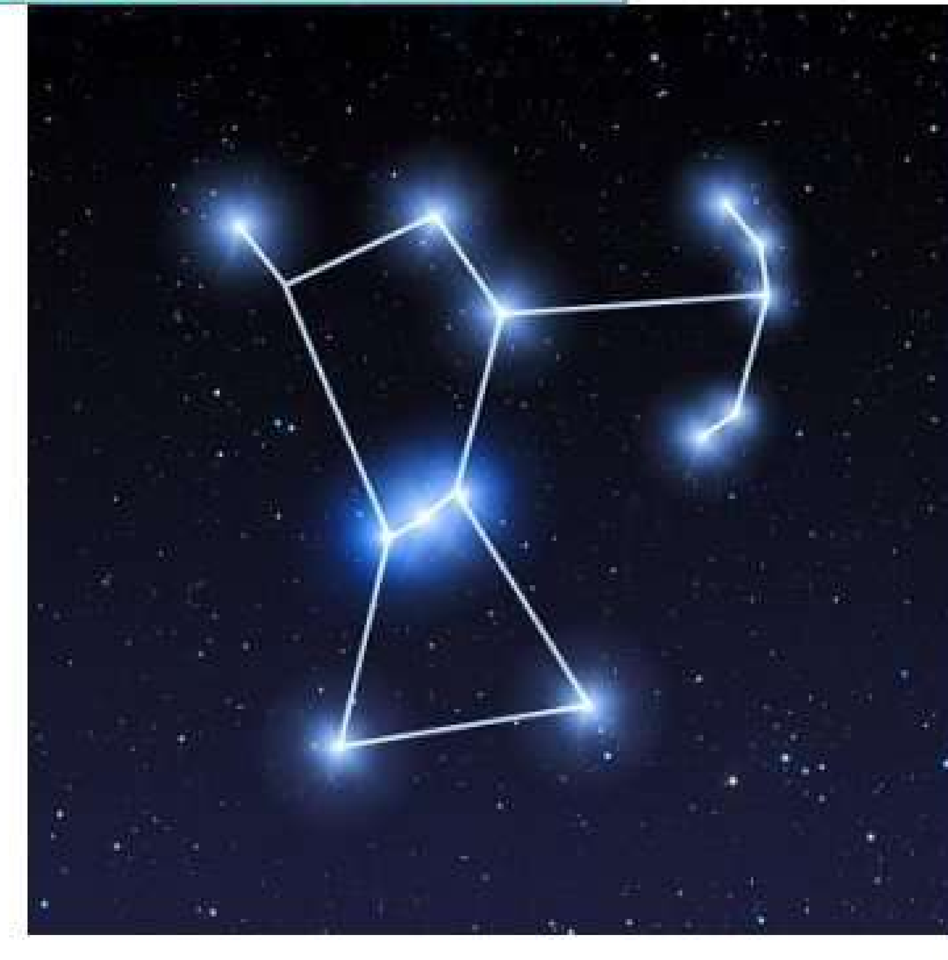
1-Stars are not made up of hot gases.

…………………………………………………………………………………………

2- Sunlight falls on the moon's surface.

…………………………………………………………………………………………

6- The opposite figure illustrate one of the famous constellations



1-The name of this constellation is……… *(Orion-Leo)*
and it looks like *(horse-hunter)*
2-This constellation consists of a group of…….
(planets-star)
3-The position of this constellation seems to appear at different locations due to…….
(Earth's rotation on its axis
- Earth's revolution around the sun)

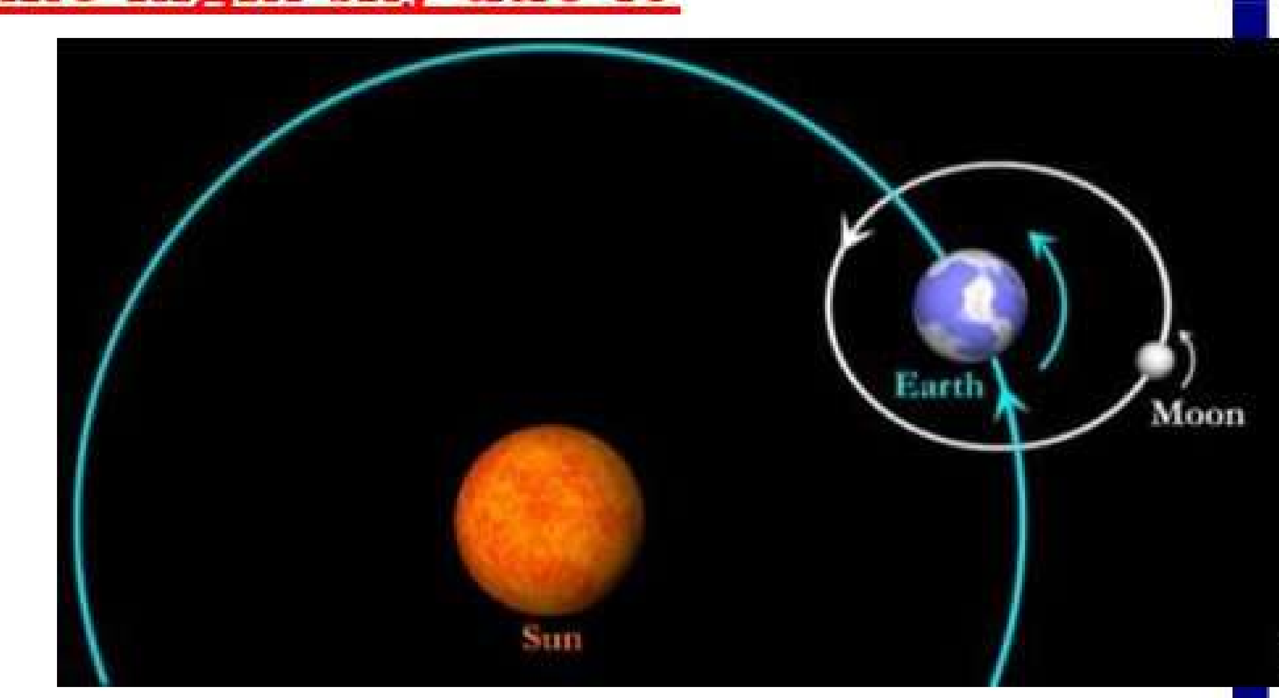
Lesson 5

Activity 10 Phases of the Moon

• *The moon revolves around Earth in an elliptical orbit.*

The moon have different phases (shapes) in the night sky due to

القمر له مراحل (أشكال) مختلفة في سماء الليل بسبب



-Earth's revolution around the Sun.

دورة الأرض حول الشمس

-The moon's revolution around Earth.

دورة القمر حول الأرض

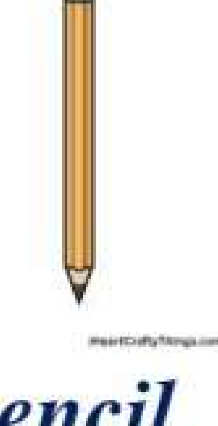
-Both Earth and the moon revolve together around the Sun.

تدور الأرض والقمر معًا حول الشمس

>In this activity, *we will identify some phases of the moon by making model of Earth-moon-Sun system.*

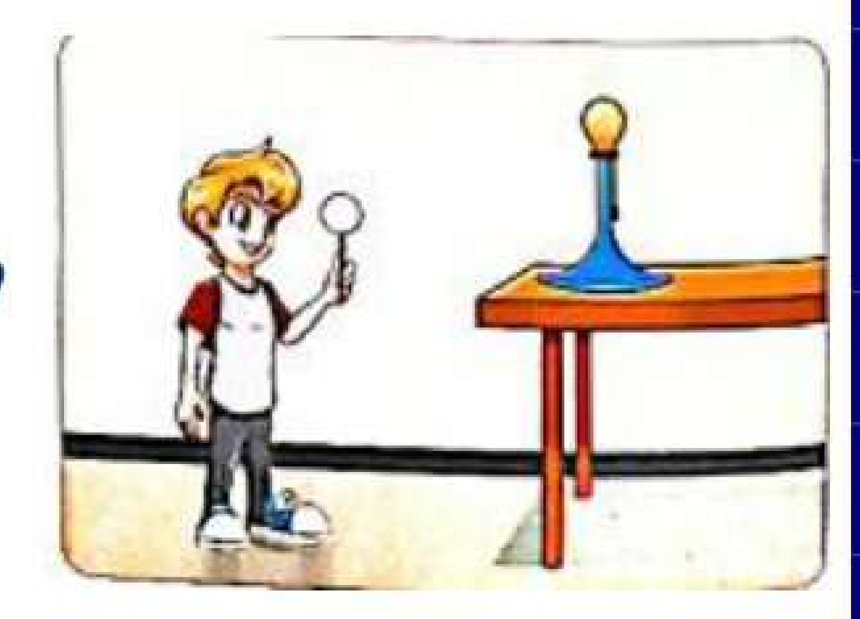
Tools





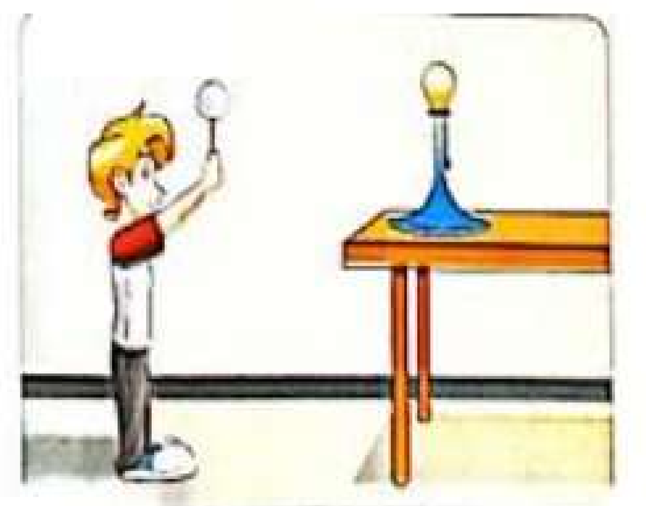
Lamp *White foam ball* *pencil*

Steps



1. Put the lamp on a table, then push the pencil into the middle of foam ball as shown in the picture, where the lamp represents the Sun, foam ball represents the moon, and you represent Earth.

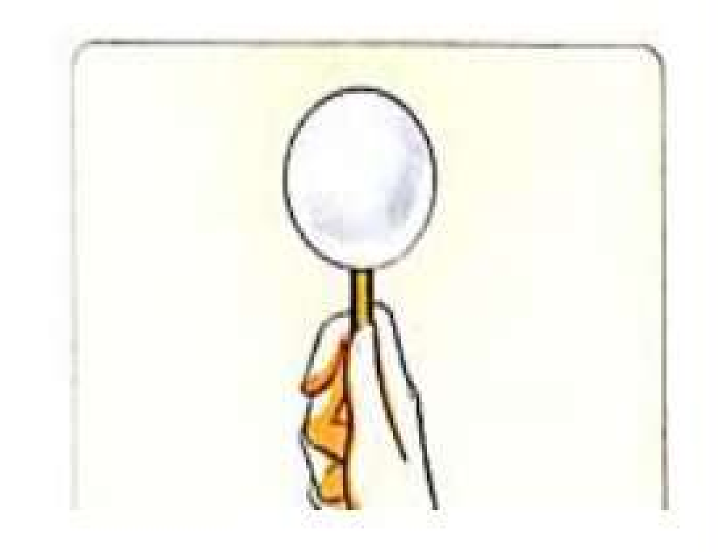
ضع المصباح على منضدة ، ثم ادفع القلم الرصاص في منتصف كرة الرغوة كما هو موضح .1
في الصورة ، حيث المصباح يمثل الشمس ، والكرة الرغوية تمثل القمر ، وأنت تمثل الأرض.



2.- Turn on the lamp, then turn off the room lights. -Hold the pencil with ball out at your arm's length as shown in the picture.

2.- شغل المصباح ، ثم أطفئ أنوار الغرفة.
- أمسك القلم بالكرة بطول ذراعك كما هو موضح في الصورة.

Observation



When you look at the ball (moon), you will see that lamp (sunlight) is shining on the side that not facing you from the ball (moon), this phase is "new moon".

المشاهدة عندما تنظر إلى الكرة (القمر) ، سترى أن المصباح (ضوء الشمس) يضيء على الجانب الذي لا يواجهك من الكرة (القمر) ، هذه المرحلة هي "القمر الجديد".

3. Turn your hand about 45 degree to the left by keeping your arm extended in front of your body.

3. أدر يدك حوالي 45 درجة إلى اليسار عن طريق إبقاء ذراعك ممدودًا أمام جسمك.

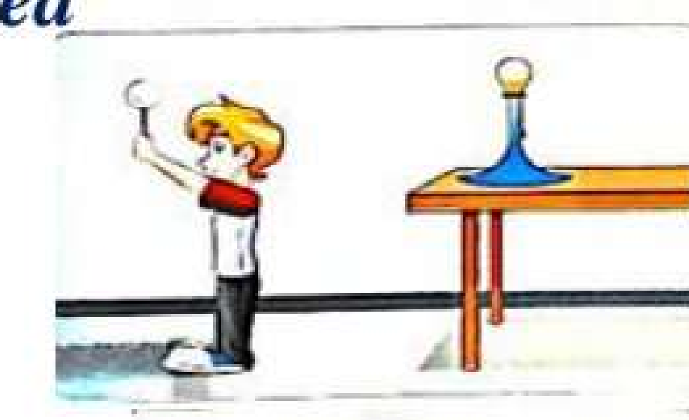
Observation

When you look at the ball (moon), you will see that the right edge of the ball (moon) is bright, this phase is "crescent".



"عندما تنظر إلى الكرة (القمر) ، سترى أن الحافة اليمنى للكرة (القمر) ساطعة ، وهذه المرحلة هي "الهلال.

4. Turn your hand to the left by keeping your arm extended in front of your body, until the ball (moon) is directly opposite the lamp (the Sun) as shown in the picture.



4. أدر يدك إلى اليسار عن طريق إبقاء ذراعك ممدودًا أمام جسمك ، حتى تصبح الكرة (القمر) مباشرة مقابل المصباح (الشمس) كما هو موضح في الصورة.

Observation

When you look at the ball (moon) you will se that the ball (moon) is completely bright this phase is(full moon)

(عندما تنظر إلى الكرة (القمر) سترى أن الكرة (القمر) ساطعة تمامًا هذه المرحلة هي (اكتمال القمر

5. Tum your hand to the left by keeping your am extended in front of your body until you see the phase of again on the ball (moon) before you return to the original position that shows the phase of (new moon)



5. حرك يدك إلى اليسار عن طريق إبقاء جسمك ممدودًا أمام جسمك حتى ترى المرحلة مرة أخرى (على الكرة (القمر) قبل أن تعود إلى الموضع الأصلي الذي يُظهر مرحلة (القمر الجديد

Observation

When you look at the ball (moon), you will see the "left" edge of the moon is bright, this phase is "orescent



"عندما تنظر إلى الكرة (القمر) ، سترى الحافة "اليسرى" للقمر ساطعة ، هذه المرحلة هي "الهلال

Conclusion

As the moon orbits Earth and both of them orbit the Sun, we can see different of the moon are sunlit, where:

:عندما يدور القمر حول الأرض ويدور كلاهما حول الشمس ، يمكننا أن نرى قمرًا مختلفًا مضاء بنور الشمس ، حيث

At new moon, we can't see the moon in the sky. في القمر الجديد ، لا يمكننا رؤية القمر في السماء

-At full moon, the moon appears like a completely bright circle in the sky.

.عند اكتمال القمر ، يظهر القمر كدائرة مشرقة تمامًا في السماء - .

>The moon phases during the lunar month: مراحل القمر خلال الشهر القمري

The moon phases are changed during the lunar month which is also known as "Hijri month

"يتم تغيير مراحل القمر خلال الشهر القمري والذي يعرف أيضًا باسم "الشهر الهجري

-The cycle of the moon phases (lunar phases) is repeated at the beginning of each lunar month as follows:

تتكرر دورة أطوار القمر (الأطوار القمرية) في بداية كل شهر قمري على النحو التالي -

1-First crescent

The edge of the moon's face appears as an illuminated crescent, where its size increases gradually with time. This phase is the first phase of the moon phases

1-أول هلال حافة القمر يظهر الوجه على شكل هلال مضيء يزداد حجمه تدريجياً مع الوقت .هذه المرحلة هي المرحلة الأولى من مراحل القمر

Then

2 First quarter:

One half of the moon's face is illuminated and the other half darkened.

2التربيع الأول :نصف وجه القمر مضاء والنصف الآخر مظلمة

Then

3. First gibbous

The brighten of the moon's face gradually and the line separating the part and the dark appears curve

3.الحدب الأول يضيء وجه القمر تدريجيًا ويظهر الخط الذي يفصل بين الجزء الثالث والظلام منحنى

Then

4 Full moon:



The apparent face of the moon that faces Earth is fully illuminated.

This phase appears in the middle of the lunar month

4اكتمال القمر: الوجه الظاهر للقمر الذي يواجه الأرض مضاء بالكامل .تظهر هذه المرحلة في منتصف الشهر القمري

Then

5- Second gibbous

The brighten part of the moon's face decreases gradually and the line separating the darkened part and the lighted part appears curved.



5الحدب الثاني يتناقص الجزء المشرق من وجه القمر تدريجيًا ويظهر الخط الفاصل بين الجزء المظلم والجزء المضيء منحنيًا

Then

6- Second quarter:





One half of the moon's face is darkened and the other half is illuminated.

6-الربع الثاني :نصف وجه القمر مظلمة والنصف الآخر مضاء.

Then

7 Second crescent:



The edge of the moon's face appears as illuminated crescent.

7الهلال الثاني :تظهر حافة وجه القمر على شكل هلال مضيء.

Then

8- New moon:



The apparent face of the moon that faces Earth is fully illuminated

This phase appears in the last day of the lunar month

8-القمر الجديد :الوجه الظاهر للقمر الذي يواجه الأرض مضاء بالكامل تظهر هذه المرحلة في اليوم الأخير من الشهر القمري

Then

Mr.-Alifaz .N .Tadrous
01005136959-/-1222978682

Exercises on Lesson (5)

1-Choose the correct answer :

1-…………. are celestial bodies that revolve around the Sun in fixed paths.

a. Stars and the moon b. The eight planets
c. The Sun and Earth d. The Sun and Jupiter

2 -……….is a celestial body that revolves around Earth and reflects the sunlight

a. Planet b. The Sun c. The moon d. Constellation

3. We see the moon shining in the sky, because it………….

a. absorbs sunlight. b. produces light.
c. lets light pass through d. reflects sunlight.

4. The Sun is a star because it……….

a. reflects light b. absorbs light
c. gives out light. d. allows light to pass through.

5. One of the reasons that makes the moon has different phases is that

a. it moves around the Earth.
b. it moves around constellation.
c. both the moon and the Sun move around Earth.
d. both the Sun and Earth revolve around the moon.

6. The moon takes one lunar…….. to complete one cycle around the Earth.

a. year b. week c. month d. day

7. When the Earth is between the moon and the Sun, it appears in the…………. phase.

a. half moon b. full moon c. new moon d. crescent

8. ………….is the moon phase that we can see more than half of the moon is illuminated.

a. Crescent b. Full moon c. Gibbous d. New moon

9. All the following sentences are related to the moon phase except……..

a. They occur due to the Earth's revolution arc
b. They occur due to the moon's revolution aroune
c. The full moon doesn't occur during winter.
d. They are repeated every one lunar month.

10. The moon appears completely bright at a new moon phase. full moon phase,

a. new moon phase. b. crescent phase.
c. full moon phase . d all phases.

11. The moon seems completely dark at

a. new moon phase. b. crescent phase.
c. full moon phase . d all phases.

12. At the beginning of lunar month we can see the edge of the moon is illuminated at………. phase.

a. crescent b. gibbous c. full moon d. new moon

2-Put (√) or (X):

1. The moon seems shiny because it absorbs sunlight (…)
2. The moon revolves around Earth once every lunar day. (…)
3. The moon phases occur due to the rotation of Earth on its axis. (…)
4. We can see the moon all the day. (…)
5. The moon reflects the sunlight during its revolution around the Earth(…)
6. At full moon phase, we can't see the moon in the sky. (…)
7. At crescent phase, a part of the moon edge appears bright. (…)
8. The moon has only one phase during the lunar month. . (…)
9. Earth rotates on its axis and also orbits around the Sun. (…)

3- Correct the underlined word:

1. The Sun is a <u>planet</u> that can gives out light. (……………)
2. The moon seems bright as it <u>absorbs</u> sunlight. (……………)
3. <u>Earth</u> is the center of the solar system. (……………)
4. Both Earth and the moon complete one cycle around the Sun every <u>24 hours.</u> (……………)

4- Cross out the odd word:

1. Earth-Jupiter - The Sun - The moon. (……………)
2. Cresco-Full moon- -Shadow-Gibbous. (……………)

5 -Write the scientific term:

1. A dark that revolves around Earth and reflects the sunlight Falling on its surface. (……………)
2. Dark revolve around the Sun in fixed orbits. (……………)
3. The moon phase which moon seems completely bright (……………)
4. The moon phase at which moon seems completely dark (……………)
5. The moon phase at which one edge only appears bright (……………)

6-Complete the following sentences

1. The moon reflects the light of……………..
2 Through the month, we can see different…….. of the moon in the sky
3. All moon phases are repeated every…………..
4. The moon orbits……… and both of them orbit………
5. At………….. phase, the moon appears completely shining in the sky at night
6. We can see only a part of the moon edges bright at phase seems
7. At the beginning of the moon's revolution around Earth, the moon completely dark at…………… phase
8. At ………. phase, the edge of the moon is illuminated, then thickness up as the moon moves.

7- Give reasons for:

1. The moon is a dark body but we see it shiny at night.

……………………………………………………………………………………

2 Earth and the moon are not considered stars

……………………………………………………………………………………

3. The moon has different phases in the night sky

……………………………………………………………………………………

8-What happens if…?

1. The moon completes one revolution around Earth

……………………………………………………………………………………

2. Half of the moon faces the Sun.

……………………………………………………………………………………

Lesson 6

Activity 11 What are stars?

The Sun

1-It is a medium-sized star نجم متوسط الحجم.

2- It is the only star that is located in our solar system, *while other stars are farther away from the solar system.*

-2إنه النجم الوحيد الموجود في نظامنا الشمسي ، بينما النجوم الأخرى بعيدة عن النظام الشمسي.لماذا تظهرالشمس لامعة فى السماء

3- Sun appears so bright in the sky. (G R) -3تظهر الشمس مشرقة جدا في السماء.

►Because it is the largest object in the solar system and it is closest star to Earth لانها اكبر جسم فى المجموعة الشمسية واقرب نجم للأرض

4- It provides Earth with heat and light for continuity of life on Earth

When you look at night sky, you will see a huge number of stars.

عند تنظر إلى السماءِ ليلا، فانك سَتَرى عدد ضخم مِنْ النجوم

Stars النجوم:

They are giant spheres of superhot gases most of them are hydrogen and helium.

هم كرات عملاقةَ من الغازات شديدة الحرارة معظمهم هيدروجينَ وهليومَ

Stars appear bright in the sky. (G R) •تظهر النجوم لامعة في السماء

Due to burning of gases that form these stars.

بسبب احتراق الغازات التي تتكون منها هذه النجوم



Observing stars at night

How does the Sun produce heat (thermal energy) and light energy?

كيف تنتج الشمس الحرارة (الطاقة الحرارية) والطاقة الضوئية؟

The Sun uses the energy produced from reactions between gases inside it to give off heat (thermal energy) and light energy.

الشمسُ تستحدم الطاقةَ الناتجة مِنْ التفاعلات بين الغازاتِ بداخلها لتعطى الطاقة الحرارية والطاقة الضوئية

العلماء• **Scientists have been interested in studying the Sun** *and how it produces huge amount of heat and light*. إهتمّوا بدِراسةَ الشمسِ و كيف تنتجُ كميةَ ضخمةَ مِنْ الحرارة والضوء

Examples of these scientists: من امثله هؤلاء العلماء

1. Copernicus: كوبرنكس

He proved that the Sun is the center of our solar system.

2. Albert Einstein:ألبرت آينشتاين

He explained how the Sun converts matter directly into energy (light and heat) that reaches planet Earth.

وضّحَ كَيفَ الشمسَ تُحوّلُ المادة مباشرة إلى الطاقةِ (ضوء وحرارة) الذي يَصِلُ كوكب الأرضَ

Notes 1-What is the result of the huge mass of the Sun?

It has a great gravitational pulling force that keeps 8 planets including Earth and more than 200 moons in continuous fixed orbits around the Sun.

كنتيجة للكتلةِ الضخمةِ للشمسِ فانها تمتلك قوة سحب جاذبيةِ عظيمةِ والتي تَبقي 8 كواكب بما فيهم أرضاً وأكثر مِنْ 200 قمر في مداراتِ ثابتةِ مستمرةِ حول الشمس.

2. Some scientists believe *that the number of stars is more than all the grains of sand on Earth's beaches.*

اعتقدُ بَعْض العلماءِ بأنّ عددَ النجومِ أكثر مِنْ كُلّ حبات الرملِ على شواطئِ الأرضِ

Put (v) or (x):

1. Stars are solid objects made up of rocks. ( )
2. Stars are mostly made up of nitrogen and helium gases. ( )

Activity 12 study the stars

Stars can help us understand how our galaxy and other galaxies formed.:

Galaxy المجرة

It is a group of stars, planets and gases held together by gravity.

Universe الكون

It is the wide space that contains celestial objects as stars, galaxies, comets, meteors

هو الفضاءُ الواسع الذي يَحتوي الأجسامَ السماويةَ كالنجوم، المجرات، المُذَنّبات، النيازك

The human-made satellites like the International Space Station

صنع الإنسانُ الأقمار الصناعية كالمحطة الفضائية الدولية

If you look into space, you can see some celestial objects with naked eye but most of these celestial objects appear as small light dots, so it is hard to differentiate between them.

إذا نظرت الى الفضاءِ، يُمْكِنُ أَنْ تَرى بَعْض الأجسامِ السماويةِ بالعين المجرّدةِ لكن أغلب هذه الأجسامِ السماويةِ تَظْهرُ كنقاط ضوئية صغيرة، لذا من الصعب التَفريق بينهم

Using technology to study the universe

-As the universe is so big, many objects are too faraway to be seen with the naked eye.

حيث ان الكون كبيرُ جداً، لذا فان العديد مِنْ الأجسامِ تكون بعيدة جداً لكي تُرى بالعين المجرّدةِ

-Astronauts cannot be sent to study these very distant objects like stars.

روّاد الفضاء لا يُمْكِن ارسالهم لدِراسَة هذه الأجسامِ البعيدةِ جداً مثل النجومَ.

So, technology helps human to invent some tools to see distant objects in more details such as: لذلك ساعدُ ت التكنولوجيا الإنسانَ لإختِراع بَعْض الأدواتِ لرُؤية تفاصيل اكثر للاجسامِ البعيدةِ مثل

1-Telescopes Such as Hubble Telescope **2-Binoculars** Such as Galileo binoculars





Note Some telescopes that are placed on Earth's surface cannot observe very distant celestial objects G.R

Due to presence the atmosphere that acts as a protective layer around Earth.

بسبب وجود الغلاف الجوّيِ الذي يعمل كطبقة وقائية حول أرض

☆*Where the atmosphere allows some light waves pass to Earth, while it blocks some other light waves.*

حيث يَسْمحُ الجوّ بمروربعض موجاتِ ضوءِ إلى الأرضِ، بينما يَمْنعُ موجاتَ ضوءِ أخرى

Exercises on Lesson (4)

1-Choose the correct answer :

1-The star that presents in our solar system, is

a. the moon b. the Sun c. the Earth d. the gravitational force

2-The Sun is a star that gives out a very big amount of

a. heat only b. light only c. heat and light. d. heat and sound

3-Our solar system contains

a. one star b. one planet c. one moon d. no stars

4-The powerful gravitational pulling force of the Sun is related to

a the light of the moon. b. the mass of the moon

c. the light of the Sun d. the mass of the Sun

5-Which of the following statements is correct?

a. Earth orbits the moon. b. the moon orbits Earth

c. Earth orbits two stars d. the Sun orbits Earth

6-……………..locate(s) at the center of our solar system

a. The moon and the Sun b. The moon and Earth

c. The Sun only d. Earth only

7-We can observe thousands of ………….the sky at night that give off heat and light

a. moons b. stars c. planets d. satellites

8-When you look at the sky, you can see all the following celestial objects with naked eye, except

.a some stars. b. the Sun c. the Earth d. the moon

9-Most of heat and light energy of the Sun are produced due to the reaction between.

a. hydrogen and rocks .b. helium and sand

c. hydrogen and helium d. rocks and sand

10. Reaction between gases of the Sun gives off

a. light and hydrogen b. heat and helium

c. light and heat d. comet and meteor

11-The temperature of the gasses that for the Sun is similar to the temperature of….

a. The Earth b. the moon c. some planets d. some stars

12-At the following appear like small light dots in the sky at night, except

a. a star b. a meteor c. a satellite d. the moon

13-We cannot send astronauts to study stars because they are

a. so cold b. faraway c. too small d. too large

14- The International Space Station is considered as a type of

a. planets b. stars c. binoculars d. satellites

2-Put (√) or (X):

1-We can observe the Sun and the moon during night (…)

2-The scientist Copernicus proved that the Earth is the center of the solar (…)

3-The scientist Albert Einstein explained how the Sun converts matter directly into energy (…)
4-Our solar system contains eight planets (…)
5-The size of the Sun is greater than the size of Earth (…)
6-The Sun is bigger than the moon (…)
7-The Sun is necessary for continuity of life on Earth (…)
8-The Sun seems smaller, because it is much farther from Earth than other stars (…)
9-The Sun is located in the center of our galaxy (…)
10- Superhot gases of the Sun bum producing heat and light energy. (…)
11-The solar system has many more stars than all the grains of sand on Earth's beaches (…)
12-The International Space Station is a type of human-made satellites(…)
13-The atmosphere lets all light waves to pass to the Earth(…)
14- Galileo binoculars helps scientists to see distant objects in space with more details (…)

3-Write the scientific term of each of the following

1. It contains the Sun, eight planets and more than 200 moons (…………)
2. The scientist who discovered that the Sun is the center of our solar system. (…………..…)
3-The scientist who discovered that how the Sun converts matter directly into energy. (…………..…)
4. It is a medium-sized star that provides us with heat and light (………..…) (…………..…)
5-They are giant spheres of superhot gases most of them are hydrogen and helium (…………..…)
6-It is a group of stars, planets and gases held together by gravity. (…………..…)
7. It is a wide space that contains celestial bodies as stars, galaxies, comets, meteors and satellites. (…………..…)
8. It is a protective layer around the Earth that allows some light waves to pass and blocks others (…………..…)

4-Complete the following sentences:

1. The Sun is the star that locates in the center of…….
2-The Sun produces ………….energy that warms the Earth
3-The solar system contains eight……… and more than 200………
4-The great gravity force of…….. keeps the eight planets in their fixed orbits.
5-Although the Sun is a..………..sized star, it looks to us much larger
6-The Sun is made up of superhot gases most of them are…….... and………..

7-The Earth is surrounded by ……….. that allows some light waves to pass through it and blocks others.

5-Give reasons for

1-The Sun looks much larger to us than other stars

…………………………………………………………………………………

2-Atmosphere limits the using of some telescopes to see distant celestial bodies

…………………………………………………………………………………

3-Stars appear bright in the sky at night

…………………………………………………………………………………

6-What happens to

The gravity of the Sun if its mass decreases than it is now

…………………………………………………………………………………

7-Study the opposite figure, then

choose the correct answer from the between brackets

1-……….has the largest mass
(The moon-The Sun-The Earth)
2-…….has the smallest size
(The Sun-The Earth-The moon)
3-…….has the lowest gravity force
(The Earth-The moon-The Sun)

